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February 5, 1980

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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT, including the amounts of the fees thereunder and the States that may be designated in international applications, consult the notice entitled "Update of information concerning the Patent Cooperation Treaty" appearing in the OFFICIAL GAZETTE of July 3, 1979.

Effective August 1, 1979 the international fees are increased to the following amounts:

Basic fee under PCT Rule 15.1(i) for an international application containing 30 sheets or less	$190.00
Supplemental fee to the Basic fee for each page of an international application in excess of 30 sheets	3.50
Designation fee under PCT Rule 15.1(ii)	45.00

July 3, 1979.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

National Inventors' Day

The Patent and Trademark Office, along with the National Council of Patent Law Associations, will co-sponsor National Inventors Day in the Public Search Room on Saturday, February 9, 1980 from 1:00 p.m. to 5:00 p.m. and Sunday, February 10, 1980 from 10:00 a.m. to 5:00 p.m. The public is invited to view the exhibits on these days and to attend the ceremony at 2:00 p.m. on Sunday, February 10, 1980, during which four inventors will be inducted into the National Inventors Hall of Fame.

In order to assemble the exhibits it will be necessary to close the Search Room on Friday, February 8, 1980 at 5:00 p.m. We would appreciate the cooperation of all users of the Search facilities by removing all personal property and items for the early closing.

Nov. 27, 1979.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,280,392, Re. S.N. 096,060, Filed Nov. 20, 1979, Cl. 357/38, ELECTRONIC SEMICONDUCTOR DEVICE OF THE FOUR-LAYER JUNCTION TYPE, Hansjochen Benda, Owner of Record: *Siemens-Schuckertwerbe Aktiengesellschaft, Erlangen, Germany,* Attorney or Agent: Herbert L. Lerner, et al., Ex. Gp.: 254

3,799,199, Re. S.N. 096,492, Filed Nov. 21, 1979, Cl. 137/625.4, DEVICE FOR MIXING TWO COMPONENTS, Dieter Rumpff, et al., Owner of Record: *Krauss Maffei Aktiengesellschaft, Munich, Germany,* Attorney or Agent: Karl F. Ross, Ex. Gp.: 341

4,047,827, Re. S.N. 094,591, Filed Nov. 15, 1979, Cl. 408/76, ACCESSORY SUPPORT PLATES FOR A MAGNET BASE DRILL, Everett D. Hougen, Owner of Record: *Inventor,* Attorney or Agent: Arthur Raisch, et al., Ex. Gp.: 324

4,062,310, Re. S.N. 094,517, Filed Nov. 15, 1979, Cl. 112/280, COOLING DEVICE FOR SEWING MACHINES, Hermann Gauch, et al., Owner of Record: *Union Special GmbH, Stuttgart, West Germany,* Attorney or Agent: John A. Schaerli, et al., Ex. Gp.: 353

4,069,743, Re. S.N. 093,036, Filed Nov. 9, 1979, Cl. 91/375 R, CONTROL UNITS FOR VEHICLE POWERSTEERING MECHANISMS, Battista Bertanza, Owner of Record: *Riva Calzoni, S.P.A., Milan, Italy,* Attorney or Agent: Terrell C. Birch, et al., Ex. Gp.: 341

4,086,257, Re. S.N. 093,631, Filed Nov. 13, 1979, Cl. 260/403, PHOSPHATIDYL QUATERNARY AMMONIUM COMPOUNDS, Barry D. Sears, Owner of Record: *Inventor,* Attorney or Agent: Richard P. Crowley, Ex. Gp.: 117

4,105,609, Re. S.N. 092,621, Filed Nov. 8, 1979, Cl. 260/23 H, DEACTIVATION OF CATALYSTS OF THE ZIEGLER TYPE USED FOR THE PREPARATION OF POLYETHYLENE IN HIGH PRESSURE, HIGH TEMPERATURE PROCESSES, Jean-Pierre Machon, et al., Owner of Record: *Societe Chimique des Charbonnages, Paris la Defense, France,* Attorney or Agent: Douglas B. Henderson, et al., Ex. Gp.: 144

4,114,188, Re. S.N. 094,160, Filed Nov. 14, 1979, Cl. 364/415, APPARATUS FOR INDICATING UTERINE ACTIVITY IN LABOUR, Michael Charles Carter, et al., Owner of Record: *National Research Development Corp., London, England,* Attorney or Agent: G. Lloyd Knight, et al., Ex. Gp.: 236

4,116,902, Re. S.N. 093,357, Filed Nov. 13, 1979, Cl. 264/22 TN, POLYURETHANE-MODIFIED ALKYD RESIN, Robert R. Harris, et al., Owner of Record: *International Minerals & Chemical Corp., Libertyville, Ill.,* Attorney or Agent: Howard J. Barnett, et al., Ex. Gp.: 144

4,125,001, Re. S.N. 094,170, Filed Nov. 14, 1979, Cl. 66/9 R, MULTI-GAUGE KNIT FABRIC WITH INLAY, David J. J. Bryars, Owner of Record: *Austen Bryars of London, Inc., Greensboro, N.C.,* Attorney or Agent: Clifton T. Hunt, Jr., Ex. Gp.: 353

4,139,023, Re. S.N. 095,510, Filed Nov. 19, 1979, Cl. 138/96 T, PIPE THREAD PROTECTOR, William M. Turley, Owner of Record: *Inventor,* Attorney or Agent: Francis A. Utecht, et al., Ex. Gp.: 243

4,148,042, Re. S.N. 093,571, Filed Nov. 13, 1979, Cl. 346/155, ELECTROGRAPHIC COPIER WITH ONE-PIECE BELT AND STYLI, Jon Coyle Mutton, et al., Owner of Record: *Tektronix Inc., Beaverton, Oreg.,* Attorney or Agent: William D. Haffner, et al., Ex. Gp.: 211

PATENT NOTICES

Certificates of Correction for the Week of Feb. 5, 1980

3,865,688	4,153,799	4,165,656	4,170,388
3,974,753	4,154,637	4,165,702	4,170,506
4,034,379	4,154,738	4,166,258	4,170,534
4,079,396	4,155,903	4,166,311	4,170,579
4,082,099	4,156,066	4,166,331	4,171,134
4,096,321	4,156,606	4,166,745	4,171,371
4,101,508	4,156,614	4,166,836	4,171,391
4,114,630	4,157,920	4,167,251	4,171,672
4,133,330	4,160,631	4,167,443	4,171,713
4,133,835	4,161,626	4,167,468	4,171,782
4,138,890	4,162,338	4,167,632	4,171,957
4,140,873	4,163,549	4,167,777	4,172,060
4,144,337	4,163,823	4,167,906	4,172,196
4,144,533	4,163,867	4,168,302	4,172,352
4,146,649	4,163,892	4,168,322	4,172,435
4,146,780	4,164,835	4,169,222	4,172,594
4,148,914	4,164,845	4,169,328	4,172,687
4,149,528	4,165,186	4,169,720	4,173,612
4,151,197	4,165,468	4,169,817	4,174,218
4,153,510	4,165,619	4,169,993	

Disclaimers

3,279,034.—*Karl B. Kaiser*, Rockford, Ill. INDEXABLE CUTTER BLADE. Patent dated Oct. 18, 1966. Disclaimer filed Oct. 15, 1979, by the assignee, *The Ingersoll Milling Machine Company*.

Hereby enters this disclaimer to claims 1, 2 and 3 of said patent.

3,980,339.—*David D. Heald*, San Mateo; *John C. McKinnell*, Bakersfield; and *Mitchell A. Lekas*, Concord, Calif. PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS. Patent dated Sept. 14, 1976. Disclaimer filed June 25, 1979, by the assignee, *Geokinetics, Inc.*

Hereby enters this disclaimer to claims 12 and 28 of said patent.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

These patent collections are open to public use and each of the patent depository libraries, in addition, offers the publications of the patent classification system (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Depending upon the library, the patents may be available in microfilm, in bound volumes of paper copies, or in some combination of both. Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the patent depository libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Birmingham Public Library	(205) 254-2555
California	Los Angeles Public Library	(213) 626-7555 Ext. 274
	Sacramento: California State Library	(916) 322-4572
	Sunnyvale Patent Library*	(408) 736-0795
Colorado	Denver Public Library	(303) 573-5152 Ext. 223
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4519
Illinois	Chicago Public Library	(312) 269-2814
Massachusetts	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Detroit Public Library	(313) 833-1458
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 214
Nebraska	Lincoln: University of Nebraska-Lincoln, Love Library	(404) 472-3411
New Jersey	Newark Public Library	(201) 733-7740
New York	Albany: New York State Library	(518) 474-5125
	Buffalo and Erie County Public Library	(716) 856-7525 Ext. 267
	New York Public Library (The Research Libraries)	(212) 790-6291
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County Public Library	(513) 369-6969
	Cleveland Public Library	(216) 623-2932
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 242-7361 Ext. 258
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Pennsylvania	Philadelphia: Franklin Institute Library	(215) 448-1226
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3128
	University Park: The Pennsylvania State Libraries	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-7722 Ext. 224
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 528-2957
Texas	Dallas Public Library	(214) 748-9071
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3043

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JANUARY 12, 1980

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—R. FRIEDMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy: Metallurgical Apparatus; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-2-79
GENERAL ORGANIC CHEMISTRY, GROUP 120—C. E. VAN HORN, Director. Heterocyclic Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	10-3-78
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—J. O. THOMAS, JR., Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g., Coating; Molding; Ink; Prosthodontics; Adhesive and Abrading Compositions; Molding, Shaping, Treating Process, and Apparatus Therefor; Irradiation (Part); Bleaching; Dyeing; Leather, Fur and Textile Treating Compositions.	3-14-79
COATING, LAMINATING AND PHOTOGRAPHY, GROUP 160—S. N. ZAHARNA, Director. Coating: Processes, Apparatus and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; and Photography.	5-3-79
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—R. F. WHITE, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-8-79
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Horology; Acoustics; Recorders; Weighing Scales.	5-25-78
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Lubrication; Illumination; Nuclear Reactors; Acoustics, Communications, Optics; Radar; Directional Radio; Torpedoes; Seismic Exploring; Cathode Ray Tube Circuitry; Cryptography; Laser Devices; Radioactive Materials; Powder Metallurgy; Rocket Fuels; Special, Fuel, Explosive and Thermic Compositions; Thermal and Photoelectric Batteries.	11-15-78
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—N. ANSHER, Director. Communications; Multiplexing Techniques; Television; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	4-16-79
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—A. L. SMITH, Director. Receptacles; Bearings; Joint Packing; Conduits; Switches; Presses; Plumbing Fixtures; Textile Spinning; Cleaning; Food Treating; Agitating; Centrifugal Separating; Geometrical Instruments; Sound Recording; Image Projectors; Web Feeding; Winding and Reeling; Cable Hoists; Measuring and Testing; Indicating; Fluent Material Handling.	1-29-79
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	9-20-78
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	2-13-78
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—M. M. NEWMAN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	12-14-78
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion-Bonding, Metal Founding; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks; Fishing, Etc.; Butchering; and Books and Printed Matter.	12-14-78
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—B. R. GRAY, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Plants; Harvesting; Earth Working and Excavating; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Information Dissemination.	1-8-79
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Couplings; Gearing; Fluid Handling and Control; Lubrication.	7-24-78
GENERAL CONSTRUCTIONS, TEXTILES, MINING AND GEARING, GROUP 350—G. M. FORLENZA, Director. Building Structures; Racks; Cabinets; Closures; Supports; Furniture; Fasteners; Locks; Pipe Couplings; Joints; Misc. Hardware; Textiles; Sewing Machines; Apparel; Footwear; Earth Engineering; Earth Drilling; Mining; Wells; Roads; Bridges; Tool Driving; Gearing; Machine Elements; Clutches.	8-17-78

Expiration of patents: The patents within the range of numbers indicated below expire during January 1980, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 3,070,801 to 3,076,194, inclusive
Plant Patents..... Numbers 2,208 to 2,223, inclusive

REISSUES

FEBRUARY 5, 1980

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

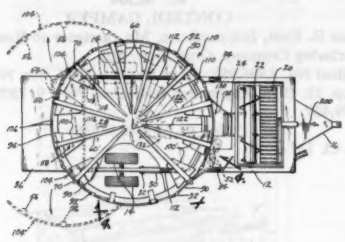
Re. 30,200
HAY STACKING MACHINE

Donald L. Henke, Creston, Nebr., assignor to Veda, Inc., Long Lake, Minn.

Original No. 4,022,004, dated May 10, 1977, Ser. No. 546,385, Feb. 3, 1975. Application for reissue May 10, 1977, Ser. No. 795,666

Int. Cl.[2] A01D *87/12*

U.S. Cl. 56—346 **55 Claims**



1. A hay stacking machine, comprising:

a platform having a top surface for the building of a hay stack thereon, said platform having a depression;

support means for supporting said platform above a supply of hay;

transport means for picking said hay up from said supply and moving said hay to said platform surface over said depression;

a frame positioned around the periphery of said platform,

a plurality of radially extending compression arms vertically pivotally connected to said frame and adapted to move between downwardly and inwardly extending positions to upwardly and inwardly extending positions, and

power means for yieldably maintaining pressure through said arms on hay on said platform and means for rotating said frame with said arms engaging said hay for moving hay into a layer and over said depression in said platform surface whereby said moving layer of hay sweeps up said hay moved to said platform surface and forms a stack from the bottom thereof with said compression arms pivoting upwardly as the stack increases in height.

Re. 30,201
METHOD AND APPARATUS FOR START-SPINNING A THREAD ON AN OPEN-END SPINNING UNIT OF AN OPEN-END SPINNING MACHINE

Fritz Stahlecker, Josef-Neidhart-Strasse 18, D-7341 Bad Uberkingen, and Hans Stahlecker, Haldenstrasse 20, D-7334 Suessen, both of Fed. Rep. of Germany

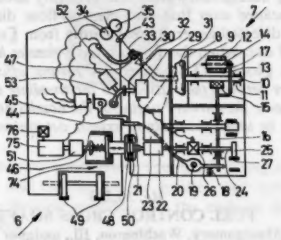
Original No. 3,987,610, dated Oct. 26, 1976, Ser. No. 528,471, Nov. 29, 1974. Application for reissue Aug. 16, 1978, Ser. No. 934,009

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1973, 2360296; Aug. 6, 1974, 2437762

Int. Cl.[2] D01H *1/12, 1/34, 15/00*

U.S. Cl. 57—263 **15 Claims**

4. An apparatus for start-spinning a thread on an open-end spinning unit of an openend spinning machine, having amobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring of fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in drive means providing the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, in which said start-spinning unit contains a driving wheel which, through



adjustment, can be coupled with a corresponding drive wheel of the drive means associated to the open-end spinning unit for the feed of said sliver.

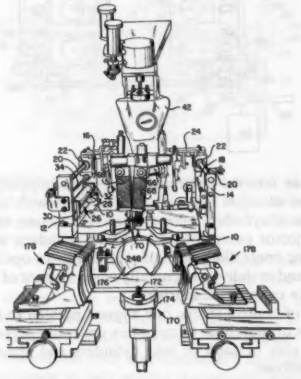
Re. 30,202
CEMENT APPLYING MECHANISM

Walter Vornberger, Tewksbury, Mass., assignor to International Shoe Machine Corporation, Nashua, N.H.

Original No. 3,901,181, dated Aug. 26, 1975, Ser. No. 499,822, Aug. 23, 1974. Application for reissue Feb. 1, 1978, Ser. No. 874,184

Int. Cl.[2] B05C *11/10, 5/02*

U.S. Cl. 118—705 **4 Claims**



1. A cement applying mechanism comprising: a [nozzle] *pair of laterally spaced nozzles* mounted for movement in [a] rearward [direction] *directions* in [a] cement applying [stroke] *strokes* between [an] initial [location] *locations* and [a] final [location] *locations* and mounted for swinging movement about [an] upright [axis] *axes*; cement flow directing means in [said] *each* nozzle, through which cement may be extruded from *each* said nozzle, extending radially from [said] *its associated* axis; *means mounting each nozzle for inward-outward movement; stop means limiting the extent of inward movement of the nozzles;* means for moving the [nozzle] *nozzles* through said cement applying [stroke] *strokes*; means so constraining the [nozzle] *nozzles* that said cement flow direct-

ing means [is] *are* directed laterally of said rearward [direction] *directions* and outwardly from [said axis] *their associated axes* during movement of the [nozzle] *nozzles* in said cement applying [stroke] *strokes* from said initial [location] *locations* to [an] intermediate [location] *locations* between said initial and final locations; [and] *means yieldably urging the nozzles outwardly at the beginning of the cement applying strokes;* means operative when the [nozzle has] *nozzles have* reached said intermediate [location] *locations* to so swing the [nozzle] *nozzles* rearwardly and inwardly about [said axis] *their associated axes* that said cement flow directing means [is] *are* directed generally rearwardly from [said axis] *their associated axes* when the [nozzle has] *nozzles have* arrived at said final [location] *locations; and means, effective when the nozzles are between their associated intermediate and final locations, to cease the outward urging of the nozzles and to cause the nozzles to be urged inwardly to extents determined by said stop means.*

Re. 30,203

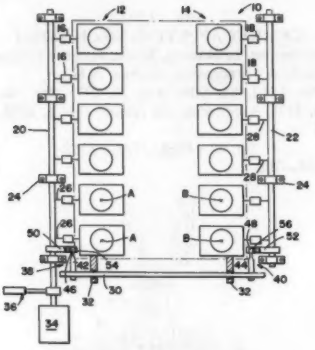
FUEL CONTROL CROSS SHAFT

Alvin W. Montgomery, Washington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Original No. 4,091,785, dated May 30, 1978, Ser. No. 706,715, Jul. 19, 1976. Application for reissue Oct. 26, 1978, Ser. No. 955,084

Int. Cl.² F02D *1/04*

U.S. Cl. 123—140 R **6 Claims**



1. In an internal combustion engine comprising a pair of pluralities of equal numbers of cylinders with said pairs of pluralities of cylinders being aligned side by side, and including a fuel injector pump for each of said cylinders, an improved system for controlling each of said pumps to operate simultaneously and to deliver a generally equal amount of fuel to each respective cylinder, comprising:

a pair of control shafts, one aligned parallel to each of said pairs of pluralities of cylinders generally perpendicular to the axes of each of said cylinders and spaced laterally therefrom;

a pair of pluralities of fuel injector pump control link means, each of said pairs of pluralities of link means being movable responsive to rotation of a respective one of said control shafts, each of said link means controlling fuel injection from a respective one of said pumps to a respective corresponding cylinder;

a cross shaft extending from adjacent a respective *end of* one of said control shafts to adjacent a respective *end of the* other *of said control shafts* thereof *in coplanar relation therewith*, and mounted to rotate about a longitudinal axis thereof;

means for controlling rotation of said cross shaft about a longitudinal axis thereof; and means communicating said cross shaft with *the ends of* each of said control shafts to cause an equal rotation of each of said control shafts about a longitudinal axis thereof responsive to a rotation of said cross shaft and about a longitudinal axis thereof.

Re. 30,204

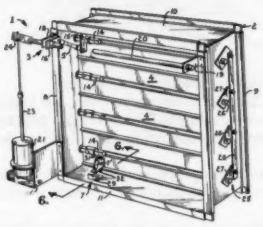
CONTROL DAMPER

James R. Root, Independence, Mo., assignor to Ruskin Manufacturing Company, Grandview, Mo.

Original No. 3,996,952, dated Dec. 14, 1976, Ser. No. 614,593, Sep. 18, 1975. Application for reissue Nov. 9, 1978, Ser. No. 959,437

Int. Cl.² F16K *17/38*

U.S. Cl. 137—77 **8 Claims**



1. A control damper for a fluid conduit, said control damper comprising:

a. a housing defining a control opening;

b. at least one vane mounted in said housing and having opposed side portions and movable between a fluid flow permitting position and a position closing the control opening;

c. resilient means mounted on said housing and connected to said vane for urging same into the position closing the control opening;

d. means mounted on said housing and connected to said vane for moving same between the flow permitting position and the position closing the control opening and having a fusible portion thereby allowing said resilient means to move said vane into the position closing said control opening in the event of temperature above the melting point of said fusible portion;

e. means mounted on said vane and said housing for retaining said vane in the position closing the control opening after melting of said fusible portion, said means for retaining said vane in said closing position after melting of said fusible portion including:

1. a stop member mounted on said housing adjacent said vane;

2. a fusible link having opposite ends;

3. a first holder member mounted on said vane and having one end of said fusible link connected thereto; and

4. a second holder member mounted on said vane and having the other end of said fusible link connected thereto, said second holder member being resilient and retained in a position to clear said stop member during movement of said vane and movable to a position in engagement with said stop member upon melting of said fusible link.

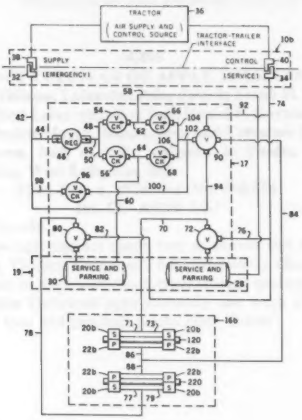
Re. 30,205
VEHICLE BRAKE SYSTEM

Michael L. Carton, Chesterfield, and Larry C. Huetsch, Mehlville, both of Mo., assignors to Wagner Electric Corporation, Parsippany, N.J.

Original No. 3,992,064, dated Nov. 16, 1976, Ser. No. 637,644, Dec. 4, 1975. Application for reissue May 8, 1978, Ser. No. 903,886

Int. Cl.[2] B60T *13/28*

U.S. Cl. 303—7 **15 Claims**



1. A vehicle brake system comprising:

an air receiving portion including means for receiving air from a supply source;

a valve portion connected to the air receiving portion including a first plurality of one-way check valve means separated for independently operating on the air received and for securing the air operated on from returning to the receiving portion;

a storage portion connected to the valve portion including a storage means separated for independently receiving the air from the first separated valve means, respectively, and for storing the air received;

a second plurality of one-way check valve means, corresponding to the first valve means, separated in the valve portion and cooperatingly connected to the separated storage means, respectively, for selecting air from one of the storage means, for independently operating on the selected air, for securing the selected air from returning to its respective storage means and for further securing the selected air from passing to another of the storage means; and

a brake portion including service brake means connected for receiving air from the storage means and also including parking brake means connected for receiving the selected air from the storage means.

Re. 30,206
SEALS AND METHOD OF MANUFACTURE THEREOF

John G. Ferguson, and Geoffrey D. Waters, both of Bristol, England, assignors to Rolls Royce (1971) Limited, London, England

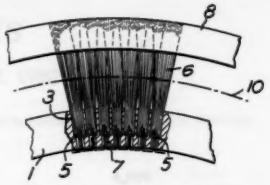
Original No. 3,917,150, dated Nov. 4, 1975, Ser. No. 524,379, Nov. 15, 1974. Application for reissue May 10, 1977, Ser. No. 795,668

Claims priority, application United Kingdom, Nov. 23, 1973, 54518/73

Int. Cl.[2] F16J *15/48;* **B23K** *31/02*

U.S. Cl. 415—174 **28 Claims**

1. A method of manufacturing a seal element comprising the steps of making a brush having a plurality of tightly packed bristles secured to and projecting from a surface of a backing member, clamping the free ends of the bristles between a pair



of clamping members, integrally [joining] *fusing* the clamping members and the tips of the bristles, and subsequently removing the backing member and the ends of the bristles attached thereto.

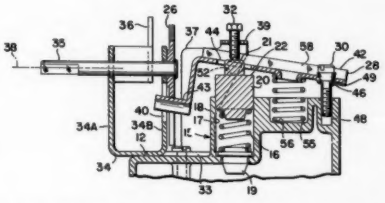
Re. 30,207
MEANS FOR CALIBRATING PRESSURE SWITCHES AT EXTRA-LOW PRESSURE SETTINGS

Lawrence A. Kolze, Bensenville, and William H. Jones, Villa Park, both of Ill., assignors to Eaton Corporation, Cleveland, Ohio

Original No. 3,846,600, dated Nov. 5, 1974, Ser. No. 408,787, Oct. 23, 1973. Continuation of Ser. No. 737,293, Nov. 1, 1976. Application for reissue Jun. 19, 1978, Ser. No. 916,992

Int. Cl.[2] H01H *35/34*

U.S. Cl. 200—81 R **8 Claims**



14. A calibration mechanism in a pressure switch of the type having a spring-biased plunger arrangement adjustable to sense different pressures to which said pressure switch responds, said mechanism comprising:

(a) means for establishing and calibrating normal "low to high" pressure settings of said pressure switch, said "low to high" pressure setting means including lever means for adjusting said plunger and selectively operative cam means in association with said lever means to provide a "low to high" range of settings, wherein said lever means includes a lever adapted for pivotal movement at only one end thereof with respect to said pressure switch, said lever having the opposite end thereof engaging said cam means, as a follower with portions thereof intermediate said ends contacting said plunger;

(b) means biasing said lever in a direction for engaging said cam means;

(c) means pivotally mounting said one lever end to said pressure switch, said pivot means including adjustable means operable, upon adjustment, to move the fulcrum of said lever with respect to said plunger for varying the spring biasing of said plunger; and

(d) wherein said biasing means acts on said lever intermediate said pivot means and said cam follower and wherein said cam follower, said biasing means and said pivot means are disposed in straight line relationship throughout the range of movement of said lever.

PLANT PATENTS

GRANTED FEBRUARY 5, 1980

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,499

DISTINCT CULTIVAR OF APPLE TREE: COOP 16

Edwin B. Williams, Lafayette; Jules Janick; Frank H. Emerson, both of West Lafayette, all of Ind.; Daniel F. Dayton, Urbana, Ill.; L. Fredric Hough, Bloomsbury, and Catherine H. Bailey, Englishtown, both of N.J., assignors to Purdue Research Foundation, West Lafayette, Ind.

Filed Nov. 6, 1978, Ser. No. 964,578

Int. Cl.[2] A01H *5/03*

U.S. Cl. Plt.—34 **1 Claim**

1. A new and distinct apple tree as shown and described, resembling 'Golden Delicious', but particularly characterized by resistance to scab, waxy skin, good storage quality, maturity with 'Golden Delicious' approximately one week after 'Delicious' and four and one-half weeks after 'Prima'.

4,500

AFRICAN VIOLET PLANT

Reinhold Holtkamp, Isselburg, Fed. Rep. of Germany, assignor to Gesellschaftsvertrag uber die Erfindergemeinschaft "OPTIMARA", Isselburg, Fed. Rep. of Germany

Filed Dec. 4, 1978, Ser. No. 966,225

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct cultivar of African violet known by the cultivar name Iowa and particularly characterized by the combined features of single, violet-shaped flowers having an intensive blue-violet color; strong and upright flower stems rising from the center of the plant so as to carry the bouquet centrally and well above the foliage; and by its vigorous growth and compact habit.

PATENTS

GRANTED FEB. 5, 1980

ERRATA

For CLASS	See PATENT NO.
138–097	4,186,475
433–201	4,186,486
433–020	4,186,487
433–008	4,186,488
252–008.55 D	4,187,073
422–063	4,187,077
430–040	4,187,103
430–057	4,187,104
430–336	4,187,105
430–001	4,187,106
430–252	4,187,107
430–203	4,187,108
430–002	4,187,109
430–544	4,187,110
430–002	4,187,111
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430–533	4,187,113
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525–243	4,187,261
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525–503	4,187,368
526–128	4,187,385
179–107 FD	4,187,413
179–175.35	4,187,414
179.175.3 F	4,187,415
367–093	4,187,487
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PATENTS

GRANTED FEB. 5, 1980

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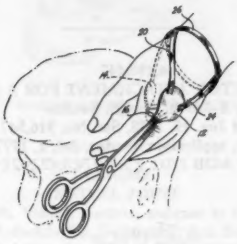
PATENTS

GRANTED FEBRUARY 5, 1980

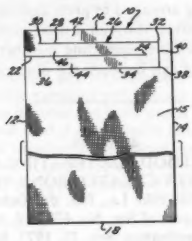
GENERAL AND MECHANICAL

4,186,442
HAIRDRESSER'S HAND PROTECTOR
James W. Kilgore, P.O. Box 33626, Seattle, Wash. 98133
Filed Apr. 3, 1979, Ser. No. 26,533
Int. Cl.[2] A41D *13/00*
U.S. Cl. 2—20 **5 Claims**



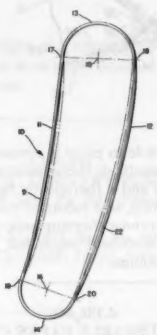
1. A hairdresser's hand protector comprising an elongated flexible pad having opposite end portions adapted to cover respectively areas on the palm and back sides of the hand contiguous to the crotch of two mutually adjacent fingers and connected by an intermediate portion narrower in width than said end portions and adapted to fit in the crotch between said fingers with the end portions drawn toward the wrist, and harness means including a wrist band and tension element connecting said wrist band to said pad end portions at transversely spaced locations on the latter respectively on the palm and back sides of the hand so as to stretch out the end portions across and lengthwise of the hand.

4,186,443
DISPOSABLE BIB
Agnita Britzman, 1440 E. Fourth St., Long Beach, Calif. 90802
Filed Aug. 21, 1978, Ser. No. 935,678
Int. Cl.[2] A41B *13/10*
U.S. Cl. 2—49 R **6 Claims**



1. A disposable bib, comprising:
a flexible sheet having first and second sides and top and bottom edges, including a bib section and a strap section formed adjacent said top edge, said strap section having a transverse first slit extending in from said one side thereof and terminating in a first end spaced from said second side, a U-shaped slit including first and second legs disposed on opposite sides of said first slit and a cross slit between said first and second legs, said cross slit being spaced intermediate said first end and said second side, said slit legs terminating in respective second and third ends spaced from said first side whereby said slits cooperate to form a first side strap between said first slit and said second slit leg, a second strap between said first slit leg and said top edge and a yoke between said first slit leg and said first slit, said first and second side straps and said yoke forming a continuous neck strap when said second side strap is pulled away from said bib section.

4,186,444
COAT SLEEVE FORM
John F. Erdman, R.D. #2, Quakertown, Pa. 18951
Filed Mar. 24, 1978, Ser. No. 889,875
Int. Cl.[2] D06C *5/00*
U.S. Cl. 223—72 **1 Claim**



1. A form for shaping a coat sleeve having a predetermined size, said form being capable of being utilized for display purposes, to assist in removing and preventing wrinkles and to prevent sagging and folds of the sleeve during storing, comprising a rod configured as a re-entrant, oval, elongated hoop having a pair of generally straight, side portions between curved end portions, the side portions generally conforming in shape with front and back crease lines of the sleeve, the rod having a memory and being of a spring type material that exclusively exerts a spring force on the rod, the memory and spring force causing the hoop to return to the configuration after the hoop having been deformed less than the elastic limit of the rod, the rod being heat treated methyl methacrylate molded to the configuration so that ends of the rod are secured together, the hoop form being such that outer edges of said side portions are spaced from each other by more than separation between front and back crease lines of the sleeve interior so that the spring force of the rod causes the side portions to exert outwardly directed forces against the crease lines while the form is inserted in the sleeve between the crease lines, end portions of the hoop being approximately semicircular and respectively proximate the shoulder and wrist ends of the sleeve while the form is inserted into the sleeve, the end portion proximate the shoulder having a greater radius than the end portion proximate the wrist end, the ends of the two semicircular end portions being approximately tangent to the ends of the side portions abutting against them so that there is a smooth transition between each of said side and end portions, said rod being hollow to form a tube, the ends of the tube being secured together by a plug held in situ against the interior wall of the tube, said plug including barbs at both of its ends, the barbs at the different ends projecting in opposite directions into the interior wall of the tube to hold the plug in situ, said barbs having an extent into the tube so that they do not extend beyond the exterior wall of the tube, plural sets of barbs being provided on at least one of the plug ends at differing longitudinal positions of the plug, a substantial separation being pro-

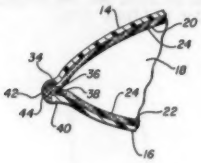
vided along the length of the plug between adjacent, oppositely directed barbs so that the dimensions of the hoop can be controlled as the plug is inserted into the tube and rods of the same length can be used for sleeves of differing dimensions.

4,186,445

DISPOSABLE COSMETIC GLOVE

Phyllis H. Stager, 7619 Chattington, Dallas, Tex. 75240

Continuation-in-part of Ser. No. 782,004, Mar. 28, 1977, Pat. No. 4,122,554. This application Mar. 3, 1978, Ser. No. 882,432
Int. Cl.[2] A41D *19/00*
U.S. Cl. 2—164 **7 Claims**



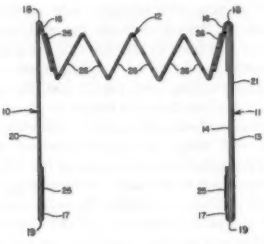
1. A disposable article to place in contact with the body for use in applying a cosmetic or therapeutic substance to the skin including a substrate and a therapeutic or cosmetic composition carried by substrate, said substrate comprising a first lamina of a lotion impervious thermoplastic resin and a second lamina of a lotion absorbent expanded polymeric material bonded to said first lamina.

4,186,446

ADJUSTABLE PAPER CAP

Thomas P. Maney, 535 Greenglade Ave., Worthington, Ohio 43085

Filed Jun. 28, 1978, Ser. No. 920,209
Int. Cl.[2] A42B *1/22*
U.S. Cl. 2—197 **3 Claims**



1. An adjustable cap comprising first and second elongated side panels with respective opposite ends adapted to be disposed in coexistensive relationship with each panel having opposed upper and lower longitudinally extending edges, each of said first and second panels having respective upper and lower marginal edge portions folded relatively inwardly at each respective longitudinally extending edge into superposed relationship between said two panels, said upper marginal edge portion being free to swing about its longitudinally extending edge toward the opposite side panel,

said second panel being formed with a front section and a rear section extending in longitudinally aligned relationship with adjacent ends of the front and rear sections telescopically interconnected to permit relative longitudinal displacement thereof for selective size adjustment, each of said front and rear sections having their opposite ends connecting with a respective end of said first panel, and

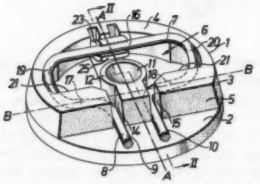
an elongated crown formed from flexible sheet material with a plurality of longitudinally extending pleated panels and having an outermost pleated panel at each side thereof secured to an inwardly facing surface of a respective upper marginal edge portion of said first and second side panels, each outermost pleated panel projecting in a direction opposite to the inwardly projecting upper marginal edge portion with at least portions of respective surfaces thereof disposed in coextensive relationship, said pleated panels disposed in coplanar relationship to said side panels when said crown is collapsed to a fully folded configuration.

4,186,447

EAR PROTECTOR ATTACHMENT FOR A HELMET

Tore G. Palmaer, S–330 30 Gnosjö, Sweden

Filed Jun. 19, 1978, Ser. No. 916,547
Claims priority, application Sweden, Jul. 1, 1977, 7707662
Int. Cl.[2] A42B *3/00; 2 209;174;6;422;423;424*
U.S. Cl. 2—423 **4 Claims**



1. A device for holding an ear defender, said device comprising a housing having a space therein to accommodate a loop forming part of a supporting member for an ear defender, said space being defined by a bottom wall, a rear wall and a front wall of said housing, said front wall having notches, formed therein to receive parts of the supporting member connected to the loop, the loop having two journalling parts arranged in line with each other which are arranged in a groove on the inside of the front wall to provide journalling axis for the supporting member, a lever pivotably journalled with one end being arranged to receive a transverse spring section of the loop, said spring section being arranged to press against the lever which is adapted to be moved through a dead center condition between two positions, the supporting member being pivotable about its journalling axis between the distinct positions.

4,186,448

DEVICE AND METHOD FOR TREATING AND HEAI ING A NEWLY CREATED BONE VOID

John H. Brekke, 4921 Pike La., Rte. #1, Duluth, Minn. 55811

Continuation-in-part of Ser. No. 677,752, Apr. 16, 1976, abandoned. This application Nov. 21, 1977, Ser. No. 853,417
Int. Cl.[2] A61F *1/24;* A61B *17/18*
U.S. Cl. 3—1.9 **8 Claims**

4. A device for treating and healing a newly created bone void comprising:

(a) a one piece body member formed of a biodegradable material,

(b) said body member having a form sufficient to fill and cover a bone void, and

(c) having enclosed interconnected randomly positioned and randomly sized and shaped voids therein each void connecting with the others and communicating with the exterior of the body through which voids blood is attracted by capillary action for saturation of the body with blood said voids occupying about 90% of the volume of

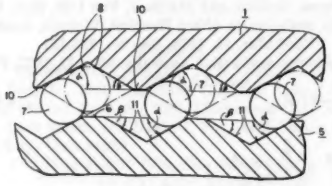
the body and said body having a wetting agent incorporated therewith, whereby a bone void filled and covered

by the body member is healed as the body member biodegrades.

4,186,449
SWIVEL JOINT

Eduard Horvath, Vienna, Austria, assignor to Otto Bock Orthopadische Industrie KG, Duderstadt, Fed. Rep. of Germany

Filed Mar. 31, 1978, Ser. No. 892,260
Claims priority, application Austria, Apr. 4, 1977, 2337/77
Int. Cl.[2] A61F *1/08, 1/04*
U.S. Cl. 3—2 **9 Claims**



1. A swivel joint, especially for artificial leg limbs, said joint comprises:

two relatively rotatable members having a pivotal axis;

thrust bearings interposed between said members and enabling relative rotation of said members from a neutral position in opposite senses; and

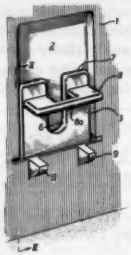
an elastic restoring element connected to said members and resisting relative rotation of said members, said element comprising a compression spring bearing at one end on a sleeve axially slidable and non-rotatable in a first of the relatively rotatable members and bearing on ramps of the second rotatable member via balls which engage one end face of the sleeve so that the distance between the sleeve and the adjacent member of the swivel joint can be varied during a relative rotation of the two members of the swivel joint and the spring stress will vary with said distance.

4,186,450
BIDET ARRANGEMENT

Ralf H. S. Rosenberg, and Morgan H. O. Ferm, both of Göthenburg, Sweden, assignors to IFÖ Sanitar AB, Bromolla, Sweden

Filed Sep. 25, 1978, Ser. No. 945,714
Claims priority, application Sweden, Sep. 28, 1977, 7710824
Int. Cl.[2] A47K *3/22*
U.S. Cl. 4—6 **4 Claims**

1. A bidet arrangement, comprising a seat which is supported by a wall of a restroom and swingable between an upper, vertical, position and a lower, horizontal, position in which the bidet function can be performed by the insertion of a hand shower nozzle into the space below a central opening in the seat, characterized in that a member (**8**), substantially perpendicular to the plane of the seat, in the upper position of the latter provides a horizontal support surface capable of absorb-

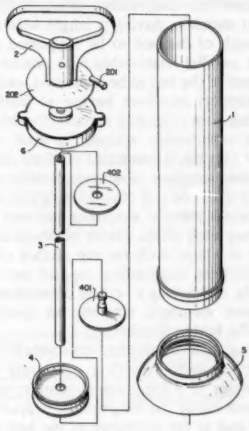


ing part of the body weight of a standing person, means being provided to lock the seat in its upper position when it is used to support a standing person.

4,186,451
PLASTIC SANITARY PUMP

Chen-Min Ruo, No. 48 Shin Fu Rd., Panchiao City, Taipei, Taiwan

Filed May 25, 1978, Ser. No. 909,522
Int. Cl.[2] E03D *11/00, 5/09*
U.S. Cl. 4—255 **4 Claims**



1. A sanitary pump comprising:

a tubular cylinder having upper and lower openings at each end thereof;

a flexible sealing cup surrounding the lower cylinder opening;

piston means slidably mounted within said cylinder, said piston means comprising a lower rigid washer plug having a flat annular body and a vertically extending centrally positioned post, an upper rigid annular washer having a centrally positioned aperture fitted over said post and a flexible annular piston

element sandwiched between said lower washer plug and said upper washer;

a hollow piston rod, said piston means vertical post being mounted within said hollow piston rod and being maintained in place by welding the vertical post to said hollow piston rod;

a handle, said handle being attached to an upper end of said piston rod;

a disc, said disc being positioned under said handle and mounted for movement with said handle for preventing water from reaching a user's hand; and

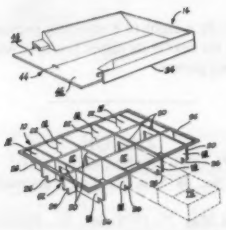
a cap mounted on and partially closing said cylinder upper opening, said cap including at least one air outlet and a central aperture for guiding said piston rod.

4,186,452

ADJUSTABLE BED SUPPORT PEDESTAL

Ronald Underwood, 1415 W. North St., #718, Anaheim, Calif. 92801

Filed Jul. 31, 1978, Ser. No. 929,574
Int. Cl.[2] A47C 27/08
U.S. Cl. 5—58 **1 Claim**



1. An adjustable bed support pedestal which comprises:

(a) At least two longitudinal substantially vertical planar support members having a length substantially equal to the length of the bed to be supported and arranged in spaced, parallel relationship with one another within the perimeter of the bed to be supported, each of the longitudinal support members having at least two vertically extending slots extending partially therethrough in spaced parallel relationship wherein at least one longitudinal support member is composed of: Two substantially vertical, planar members in spaced, parallel, end to end relationship with one end of one facing one end of the other; and a bridge member extending between and attached to the facing ends of the planar members and having a top surface co-planar with the top surface of transverse support members, longitudinal support members, and a rail assembly, and having a vertical dimension less than that of the planar members, whereby an opening is provided below the bridge member;

(b) At least two transverse, substantially vertical planar support members extending outwardly at substantially right angles to a longitudinal support member from an inside end inside the longitudinal support member to an outside end at the perimeter of the bed to be supported and arranged in spaced parallel relationship with one another, each of the transverse support members having a vertically extending slot extending partially therethrough near its inside end and adapted to intersect with a corresponding slot in the longitudinal support member so that the top surfaces of the transverse and longitudinal support members are co-planar and the bottom surfaces of the longitudinal and transverse support members are co-planar wherein the inside end of a first transverse support member intersecting one longitudinal support member is in spaced, opposed, parallel relationship with the inside end of a second transverse longitudinal support member and including as an additional element a bridge member extending between and attached to the inside ends of the first and second transverse support members and having a top surface co-planar with the top surfaces of the transverse support members, longitudinal support members, and a rail assembly, and having a vertical dimension less than that of the transverse support members, whereby an opening is provided below the bridge member;

(c) A rail assembly extending between the outside edges of the longitudinal and transverse support members beneath the perimeter of the bed to be supported and resting in grooves provided in the support members adjacent the outside ends thereof so that the top surface of the rail assembly is co-planar with the top surfaces of the longitudinal and transverse support members;

(d) Means attached to the outer perimeter of the rail assembly for securing a valance thereto, which comprises one portion of a male-female track assembly, the other portion of the assembly being attached to the valance, and wherein the valance securing means comprises the female portion of the male-female track assembly;

(e) A substantially planar bed support member having a length and width substantially equal to the length and width of the bed to be supported and adapted to be positioned beneath the bed in a generally horizontal position and upon the top surfaces of the transverse support members, the longitudinal support members, and the rail assembly; and

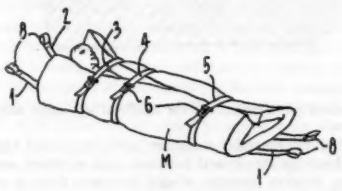
(f) A storage bin slidably disposed between support members and beneath the rail assembly.

4,186,453

RESTRAINT PACKAGE

John E. Burns, Seaford, and Martin J. Van Lith, Kew, both of Australia, assignors to Alfred Hospital, Victoria, Australia

Filed Mar. 21, 1978, Ser. No. 888,781
Claims priority, application Australia, Mar. 22, 1977, PC9510
Int. Cl.[2] A62C 7/00
U.S. Cl. 5—82 R **8 Claims**



1. A package for a restraint having a plurality of elongate bands, comprising a base member and an overlying cover member interconnected to form an envelope for containing the restraint in a predetermined configuration, said cover member having openable portions defined by weakening lines formed in the cover, and manually engageable means attached to each said portion to facilitate manual opening of said portions along said weakening lines which upon said manual opening expose at least the ends of said bands for withdrawal from the envelope.

4,186,454

PORTABLE PLAYPEN

Richard E. Cone, 249 Bowman Dr., Kent, Ohio 44240

Filed Sep. 20, 1978, Ser. No. 944,143
Int. Cl.[2] A47C 27/08
U.S. Cl. 5—99 R **10 Claims**

1. A multi-sided playpen having a frame structure comprising

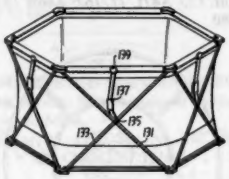
a plurality of upper corner hinge brackets between adjacent sides of said playpen;

a plurality of substantially centrally hinged railings;

means for pivotally connecting the ends of said railings to said upper corner hinge brackets so as to substantially form a multi-sided structure;

a plurality of lower corner hinge brackets between adjacent sides of said playpen;

a plurality of X-shaped structures equal in number to the sides of said playpen, each of said structures being pivoted substantially at their center points;



means for pivotally connecting the free ends of each of said X-shaped structures to adjacent said upper and lower bracket members so as to form said multi-sided playpen; and

releasable locking means connected between each of X-shaped structures and said centrally hinged railings.

4,186,455

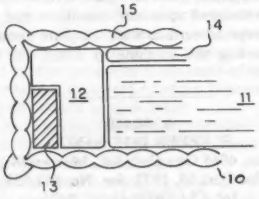
COMPOSITE WATER BED MATTRESS

Moroni Fox, Jr., 1568 Stonemore Cir., Salt Lake City, Utah 84121; Moroni Fox, Sr., 2760 Claybourne Cir., Salt Lake City, Utah 84109, and Dana G. Fox, 4467 Nancy Dr., Salt Lake City, Utah 84120

Filed Feb. 8, 1978, Ser. No. 876,132

Int. Cl.[2] A47C *27/08*

U.S. Cl. 5—451 **20 Claims**



1. In a mattress construction having a conventional thickness;

a water mattress comprising a flexible bladder for holding a body of water;

a peripheral restraining member for providing lateral support in all directions for said water mattress, said restraining member comprising:

an encircling flexible foam restraining member having a substantially vertical surface adjacent said bladder and having a height at least as great as said bladder when said bladder is filled with water, said foam restraining member forming a cavity for said water mattress,

a peripheral rigid box-like member in contact with the outer surface of said foam restraining member remote from said bladder, said rigid box-like member having a height no greater than the height of said bladder when said bladder is filled with water,

a foam cushion superposed upon the upper surface of said rigid box-like member to a height substantially level with the upper surface of said foam restraining member.

4,186,456

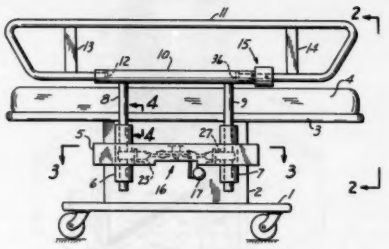
RAIL SYSTEM FOR BED OR STRETCHER

David F. Huempfner, Kewaunee, Wis., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Jul. 14, 1978, Ser. No. 924,777

Int. Cl.[2] A47C *7/00*

U.S. Cl. 5—428 **14 Claims**



1. A patient restraining rail system for joining to a bed or the like comprising: a rail support with an anchoring member having end portions; an outwardly pivoting generally C-shaped rail telescopically connected to the anchoring member's end portions at pivot joints with the anchoring member extending across a gap in the rail; means attached to the support for adjusting the location of the rail's pivot axis; and a spring biased lock with an element attached to each of the anchoring member and rail to hold the rail in a particular pivotal position relative to the anchoring member.

4,186,457

PEDIATRIC WATER MATTRESS

Robert J. Amelung, St. Louis, Mo., assignor to Aqua-Babe Corporation, St. Louis, Mo.

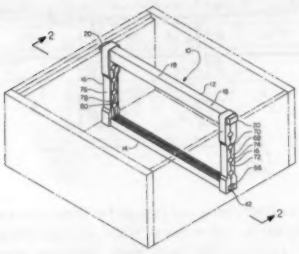
Filed Dec. 20, 1978, Ser. No. 971,330

Int. Cl.[2] A47C *27/08*; A61G *7/04*

U.S. Cl. 5—452 **9 Claims**

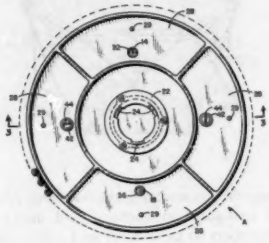
1. A pediatric water mattress for infant therapeutic usage, comprising, a pair of inner liners sealed together around their periphery for forming an inner chamber and provided for holding a supply of water, a pair of outer liners also sealed together around their perimeter for forming an outer chamber and being larger than the pair of inner liners, said inner liners formed water chamber being located within the said outer chamber, said outer chamber arranged for holding some minimal quantity of air, a valve means connected through both an inner and outer liner for use for introducing a supply of water into the said inner chamber, a check valve connecting through the outer liner and for use for investigating the contents of the outer air chamber, and guard means connecting around the perimeter of the said outer liner to restrain any infant located upon the mattress wherein said guard means extends upwardly above the said liner to which it attaches, and said guard means being coextensive with the perimeter of the liner to which it connects.

4,186,458
KNOCKDOWN BEEHIVE FRAME
James P. Caviglia, III, 17300 Ave. 324, Visalia, Calif. 93277
Filed Apr. 27, 1978, Ser. No. 900,614
Int. Cl.[2] A01K *47/02*
U.S. Cl. 6—10 16 Claims



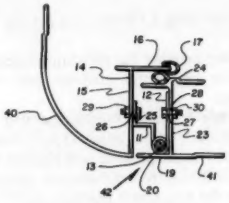
8. An improved beehive frame comprising:
an elongated substantially rigid top member formed for horizontal disposition and having top member interconnector means on each end thereof;
an elongated substantially rigid bottom member formed for horizontal disposition and having bottom member interconnector means on each end thereof;
a pair of elongated substantially rigid side members formed for vertical disposition and having side to top interconnector means on their lower ends;
each of said top interconnectors on said top member being releasably interconnectable with a different one of said side to top interconnectors on said side members and each of said bottom interconnector means on said bottom member being releasably interconnectable with the side to bottom interconnectors on a different one of said side members, whereby said top member, said bottom member, and said side members are interconnectable into a rigid rectangular frame structure and permit knockdown of said frame structure into said individual members by release of said interconnections;
said top interconnector means includes an ear projecting from an end of said top member in longitudinal alignment therewith and having a reduced dimension defining a shoulder between said ear and said top member main body at the proximal end of said ear and means defining a hanger surface at the distal end of said ear disposed to rest upon a surface to support said top member in a generally horizontal position, and first-locking components; and
said side to top interconnectors include receptacles for said ears, said receptacles having a leading portion and a trailing portion separated by a depth less than the longitudinal extension of said ears whereby when said ears are inserted in said receptacles with the leading portion of said receptacles engaging said shoulder at the proximal end of said ears, the distal end of said ears, and particularly said hanger surface, extends beyond the trailing portion of said receptacle, and second locking components interconnected with said receptacle and disposed to engage and interlock with said first locking components, said locking components being manually manipulable to release said interlock.

4,186,459
CARPET BRUSH ATTACHMENT FOR A FLOOR TREATING MACHINE
Richard F. Wulff, Maple Plain, Minn., assignor to Advance Machine Company, Spring Park, Minn.
Filed Nov. 2, 1978, Ser. No. 957,014
Int. Cl.[2] A47L *11/162;* A46B *13/02*
U.S. Cl. 15—180 6 Claims



1. A carpet brush attachment for a floor treating machine comprising:
(a) a circular surface engaging plate normally horizontally disposed and support for the machine on a surface,
(b) said plate having a circular hub extending axially and vertically therefrom for connection with a source of power for rotation of said plate,
(c) a multiplicity of spaced extensions formed on said circular plate adjacent the outer edge thereof and spaced radially outwardly from said circular hub and parallel to the longitudinal axis of said hub,
(d) a ring brush having an inner diameter greater than the diameter of said plate and surrounding said plate,
(e) said ring brush having spaced holes adjacent the inner edge thereof through which said extensions freely extend for contact of said ring brush by said extensions for rotating said ring brush when said plate is rotated and allowing said brush to move upon said extensions and rest floating by on a carpeted surface with the plate upon the surface and supporting the machine to which the brush is attached.

4,186,460
SLEEPER BOX HINGE
J. Clyde Artman, 4045 Gun Club Rd., Murrysville, Pa. 15668
Filed Dec. 19, 1977, Ser. No. 861,853
Int. Cl.[2] E05D *11/00, 5/06*
U.S. Cl. 16—137 3 Claims



1. A sleeper box hinge comprising:
a. a frame member;
b. a swinging member attached to the frame member;
c. a self-lubricating pin fit at the location of the frame member and swinging member, to facilitate the free rotation of the swinging member about the frame member;
d. a side wall member dimensioned on the side of a sleeper box and attached to the frame member, said side wall

member having a first side perpendicular to its second side;

e. a flexible clip-on seal attached to the first side and located furtherest away from the second side; and

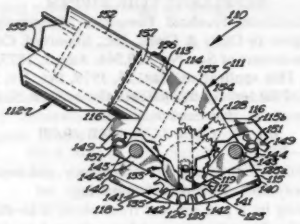
f. means for closing a sleeper box door so that water and air are prevented from passing through a rubber seal, as well as stopping the door when opened at the desired position, and attached to the swinging member.

4,186,461

HAND SUPPORTED SKINNING DEVICE

Lyndon R. Leining, Austin, Minn., assignor to Geo. A. Hormel & Company, Austin, Minn.

Filed Apr. 17, 1978, Ser. No. 897,140
Int. Cl.[2] A22B *5/16*
U.S. Cl. 17—21 **7 Claims**



1. A hand held power skinning knife for skinning animals such as hogs and the like, comprising:

a housing,

a handle mounted on said housing and projecting therefrom,

an elongate blade mounted on said housing and extending transeversely thereof and having a cutting edge,

an elongate, revolvable roll assembly mounted on said housing and extending transversely thereof, said roll assembly including a plurality of toothed wheels having teeth projecting outwardly therefrom in close proximity to the cutting edge of said blade and cooperating with the latter to grip a portion of an animal skin therebetween,

a second elongate blade mounted on said housing and extending transversely thereof and having a cutting edge positioned in close proximity to the teeth of said assembly, said blades having their cutting edges disposed in opposed relation with respect to each other,

a driven element connected with said toothed wheels,

a revolvable drive element mounted on said handle and engaging said driven element, and

reversible power means engaging said drive element for revolving the roll assembly in opposite directions whereby a a portion of animal skin gripped between the roll assembly and one of said blades will be progressively pulled against the cutting edge of one of said blades to cut a strip of skin from the animal carcass.

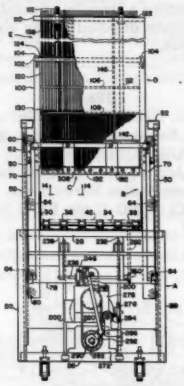
4,186,462

TENDERIZER

Louis A. Bettcher, Amherst, Ohio, assignor to Bettcher Industries, Inc., Birmingham, Ohio

Filed Aug. 13, 1976, Ser. No. 714,026
Int. Cl.[2] A22C *9/00*
U.S. Cl. 17—25 **10 Claims**

1. An apparatus for treating a comestible product, such as, meat comprising: a conveyor for conveying a product to be processed; a first carriage having a multiplicity of closely spaced aligned apertures; discrete assemblies each comprising a rod member slidable in each of the aligned apertures of said first carriage and operatively connected thereto by overload release means; a long thin product piercing instrumentality connected to a first plurality of said rod members with their piercing ends facing said conveyor; a plate-like member at the side of said first carriage facing said conveyor and normally spaced from said first carriage and connected to a second plurality of said rod members and having apertures therein through which said intrumentalities extend; power means for reciprocating said first carriage towards and from said conveyor to cause said instrumentalities to pierce a product on said



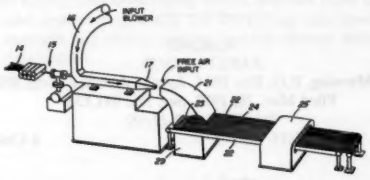
conveyor; a second carriage arranged to move in coordination with movements of said first carriage; a member connected to said second carriage to engage a product being pierced by said instrumentalities; and means for locking said second carriage in position with said member connected thereto engaged with the product while said instrumentalities are being withdrawn from the product.

4,186,463

APPARATUS FOR MAKING BIAXIALLY ORIENTED NONWOVEN FABRICS AND METHOD OF MAKING SAME

Preston F. Marshall, Walpole, Mass., assignor to The Kendall Company, Boston, Mass.

Division of Ser. No. 506,843, Sep. 17, 1974, Pat. No. 3,969,561.
This application Dec. 22, 1975, Ser. No. 643,553
Int. Cl.[2] B29C *13/00*
U.S. Cl. 19—304 **7 Claims**



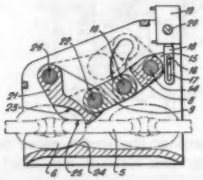
1. Apparatus for making a biaxially oriented nonwoven fabric having areas of high fiber density and low fiber density wherein a majority of the fibers in said low fiber density areas are oriented in a substantially cross direction and a majority of the fibers in said high fiber density areas that lie directly adjacent said low fiber density areas are oriented in a direction substantially parallel with the contours of the configuration of said low fiber density areas comprising:

high velocity fluid jet propelling means for carrying discretely separated textile-length fibers in a fluid-borne stream;

a curved distributor chamber having an opening on the bottom thereof for receiving said fluid-borne stream and being workably disposed with said propelling means;

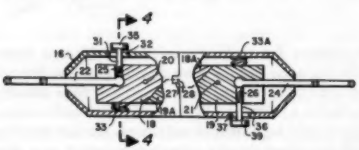
a moving air-permeable conveyor screen disposed under said chamber;
a plurality of equidistantly spaced-apart finger-like striping bars disposed across said moving screen;
a vacuum means disposed under said moving screen and said chamber for aiding said fluid-borne stream to locate its fibers on said screen in a particular manner; and,
a means for collecting a biaxially oriented striped nonwoven fabric, said means disposed at the end of said moving conveyor screen.

4,186,464
CHAIN STOPPER
Harry S. Sandoy, Kolbjornsvik, Norway, assignor to Pusnes Mek, Verksted A/S, Pusnes, Norway
Filed Apr. 24, 1978, Ser. No. 899,240
Claims priority, application Norway, Apr. 28, 1977, 771497
Int. Cl.[2] F16G *15/04;* B63G *21/18*
U.S. Cl. 24—116 R **2 Claims**



1. In a chain stopper comprising a framework; a chain track extending through said framework for receiving said chain; a pawl pivotably attached at one of its ends to said framework and comprising two parts pivotably connected to each other in the fashion of a toggle link which remains substantially unbent in the chain-stopping position of said pawl and is actuated to a bent position when said chain is released; and an arm pivotably attached at one of its ends to the other end of said pawl and pivotably attached at its other end to said framework, said arm having a bearing part resting against and substantially conforming to the surface of said chain when said pawl is in its chain-stopping position; the improvement wherein the pivot axis of pivotable attachment of said pawl to said framework and the pivot axis of pivotable attachment of said arm to said framework are on opposite sides of a plane which is perpendicular to said chain track and which extends through the axis of pivotable attachment of said arm to said pawl.

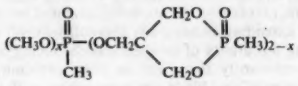
4,186,465
SAFETY LOCK
Jim L. Manning, P.O. Box 1504, Apache Junction, Ariz. 85220
Filed Mar. 28, 1978, Ser. No. 891,133
Int. Cl.[2] A44B *21/00*
U.S. Cl. 24—201 HH **8 Claims**



1. A locking device comprising, in combination
first and second sleeves each having center openings extending along a longitudinal axis;
first and second bar members each having longitudinal axes connecting first and second ends and being positioned within the center openings of said first and second sleeves respectively to extend along the longitudinal axes thereof, the first and second bar members being fastened within the respective sleeves by pivot means permitting pivoting of the bar member within the sleeve;
each bar member including a lip forming a surface adjacent the first end thereof, said surface being positioned normal to the pivot means and extending laterally of the longitudinal axis of the bar member; and
a first operator engaging the first bar member and extending external to the associated sleeve for pivoting the bar member about the supporting pivot means whereby the ends of the first and second sleeves adjacent the bar member lips can be placed together and the first bar member pivoted to overlap the lip surfaces and lock the bar members and attached sleeves together.

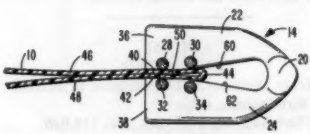
4,186,466
METHOD FOR MAKING FLAME RETARDANT-WATER REPELLENT COIL ZIPPER
Robert Schleifstein, Freehold Township, Monmouth County, N.J., assignor to Coats & Clark, Inc., Stamford, Conn.
Continuation-in-part of Ser. No. 820,564, Aug. 1, 1977, Pat. No. 4,111,647. This application Mar. 15, 1978, Ser. No. 886,632
The portion of the term of this patent subsequent to Sep. 5, 1995, has been disclaimed.
Int. Cl.[2] C09K *3/28;* A44B *19/00*
U.S. Cl. 24—205.13 C **7 Claims**

1. A method of imparting fire retardancy and water repellency to a polyester coil zipper comprising:
(A) applying by a pad process from about 1 to about 20% (owg) of a fire retardant and from about 1 to about 10% (owg) of a water repellent simultaneously in an aqueous solution or dispersion to said coil zipper; and
(B) drying and curing the thus-treated zipper,
said water repellent being a perfluoro-containing polymer and said fire retardant being:



where x = 0 or 1.

4,186,467
WELDED THERMOPLASTIC STRINGER FOR SLIDE FASTENER AND METHOD OF MANUFACTURE
Charles T. Lawrence, Saegertown, Pa., assignor to Textron, Inc., Providence, R.I.
Filed Aug. 22, 1977, Ser. No. 826,543
Int. Cl.[2] A44B *19/04*
U.S. Cl. 24—205.16 R **8 Claims**



1. A stringer for a slide fastener comprising
a tape of longitudinally folded polymer film material forming respective overlying folded portions,
a train of thermoplastic coupling elements each including a head portion and a pair of leg portions extending in generally the same direction from opposite sides of the head portion,
each pair of said leg portions extending over the respective folded portions on opposite sides of the tape at one longitudinal edge of the tape,

said leg portions terminating in heel portions which are joined by welds to the respective folded portions of the tape,

said folded portions being joined together by welds therebetween at the locations of the welds between the heel portions and the tape,

said leg portions of each coupling element having respective inside surfaces which diverge from the welds toward the opposite sides of the head portion,

said tape having a longitudinal portion at its one longitudinal edge between the diverging inside surfaces of the leg portions spaced from the welds and having portions between adjacent coupling elements free of the welds,

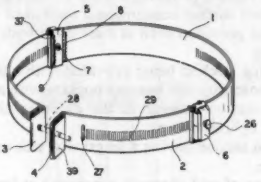
said polymer film including a layer of polymer having a high degree of molecular orientation extending transversely to the tape so that lines of molecular orientation in the film extend continuously across the tape between adjacent coupling elements through the longitudinal portion to the one longitudinal edge.

4,186,468

RING CLAMP AND METHOD OF MAKING SAME

Michel H. Zaniewski, Avenue Ferdinand de Lesseps, 34110 Frontignan, France

Filed May 2, 1978, Ser. No. 902,162
Claims priority, application France, May 2, 1977, 77 13790
Int. Cl.[2] A44B *21/00*; F16L *33/00*
U.S. Cl. 24—243 B **5 Claims**



1. A clamp comprising:

a pair of flexible and relatively inextensible sheet-metal strips each having a pair of strip ends and normally formed into an annulus with one strip end of one strip spaced angularly from one strip end of the other strip and each other strip end lying against the inner face of the other strip intermediate the strip ends thereof;

a sheet-metal buckle on said other end of each of said strips and having a pair of bend-over ends embracing and slidably receiving the other strip intermediate said strip ends thereof;

means for drawing said one strip ends angularly together and, when said strips are snugly fitted around an object to be clamped, thereby pressing each of said buckles tightly against said object and locking each of said buckles to the strip normally slidable therein.

4,186,469

APPARATUS FOR FULLING FABRIC

Shigeki Kondo, Inagi, Japan, assignor to Tokyo Juki Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 779,832, Mar. 21, 1977, abandoned. This application May 31, 1978, Ser. No. 911,084
Int. Cl.[2] D06C *17/00*; D06B *13/00*
U.S. Cl. 26—19 **9 Claims**

1. An apparatus for fulling a wool-containing fabric in the form of a pliable sheet, said apparatus comprising:

a cooling station;

a moisture applying station positioned downstream of said cooling station, taken in a feed direction through the apparatus;

a drying station positioned downstream of said moisture applying station, taken in said feed direction;

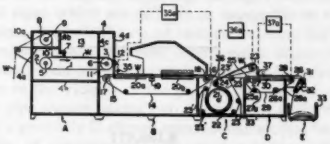
first endless belt means for conveying a wool-containing fabric in the form of a pliable sheet in said feed direction through said cooling station;

said cooling station including means for cooling said fabric sheet to a temperature below 0° C.;

second endless belt means, separate from said first endless belt means, for receiving the cooled fabric sheet from said first endless belt means, and for conveying said fabric sheet in said feed direction through said moisture applying station;

said first endless belt means having a discharge end positioned vertically above an inlet end of said second endless belt means, such that said fabric sheet falls downwardly from said first endless belt means onto said second endless belt means;

tension detection lever means, positioned to contact said fabric sheet at an area thereof between said discharge end of said first endless belt means and said second endless belt means, for detecting varying tension of said fabric sheet;



control means, operatively connected to said tension detection lever means, for controlling the speed of movement of said second endless belt means in response to the amount of tension detected by said tension detection lever means such that said fabric sheet is maintained substantially tensionless during passage through said moisture applying station;

said moisture applying station including first steam jet means for jetting steam at a temperature lower than 100° C. against said fabric sheet on said second endless belt means;

said moisture applying station further including second steam jet means, separate from said first steam jet means and downstream thereof, taken in said feed direction, for jetting steam at a temperature above 100° C. against said fabric sheet on said second endless belt means; and

said drying station including means, separate from said second endless belt means, for conveying said fabric sheet through said drying station, and for therein drying said fabric sheet.

4,186,470

APPARATUS USEFUL IN CONTROL OF EDGE UNIFORMITY IN NONWOVEN FABRICS

Frederick L. Stoller, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 723,394, Sep. 15, 1976, Pat. No. 4,113,827. This application Jun. 27, 1978, Ser. No. 919,586
Int. Cl.[2] D04H *18/00, 1/46*
U.S. Cl. 28—112 **2 Claims**

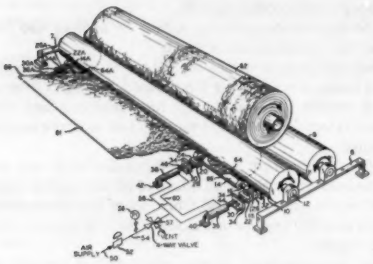
1. Apparatus comprising:

a crosslapper for forming a nonwoven fabric,

a needle loom for needling said fabric,

at least three rolls for forming nips positioned for receiving and compressing each edge of a crosslapped, needled fabric wherein at least one first roll has a fixed axis and

two second rolls have a movable axis and are positioned at each edge of the fabric, the axes of the second rolls are



positioned adjacent and approximately parallel to the axis of the first roll and

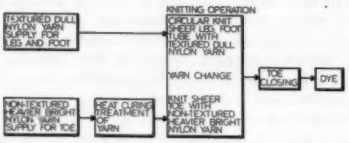
means for forcing the second rolls against the first roll.

4,186,471

METHOD OF MAKING HOSIERY

Nicholas Wehrmann, and Charlie L. Williams, both of Wilkesboro, N.C., assignors to Ithaca Textiles, Inc., Wilkesboro, N.C.

Filed Jun. 12, 1978, Ser. No. 914,588
Int. Cl.[2] D06B *3/30*
U.S. Cl. 28—154 **12 Claims**


TEXTURED DULL NYLON YARN SUPPLY FOR LEG AND FOOT
KNITTING OPERATION
CIRCULAR KNIT SHEER LEG, FOOT TUBE WITH TEXTURED DULL NYLON YARN
YARN CHANGE
TOE CLOSING
DYE
NON-TEXTURED HEAVIER BRIGHT NYLON YARN SUPPLY FOR TOE
HEAT CLOSING TREATMENT OF YARN
KNIT SHEER TOE WITH NONTEXTURED HEAVIER BRIGHT NYLON YARN

1. A method for producing a circular and post-knit dyed, sheer nylon hosiery product having the appearance when worn of an overall substantial uniformity in color and sheerness in its leg, foot and toe portions together with reinforcement properties in the toe portion thereof, said method comprising:

(a) circular and tubuar knitting a sheer leg and foot portion from a supply of textured relatively dull, nylon yarn of a selected weight;

(b) executing a yarn change and circular and tubular knitting a sheer toe portion from a supply of strand heat cured, substantially non-textured relatively bright nylon yarn of a selected weight sufficiently heavier than the weight of said leg and foot yarn to provide corresponding reinforcement and dye properties in said toe portion enabling the hosiery product as worn to exhibit both a reinforced toe portion and an overall appearance of substantial uniformity in color and sheerness throughout said leg, foot and toe portions;

(c) closing said toe portion; and

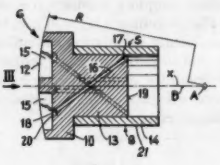
(d) dyeing the resulting hosiery product with selective dyes to produce a hosiery product as worn having both a reinforced toe portion and an overalll appearance of substantial uniformity in color and sheerness throughout said leg, foot and toe portions.

4,186,472

SUPPORT ELEMENT FOR CONTROLLED DEFLECTION ROLL

Mario Biondetti, Schio, Italy, assignor to Escher Wyss Limited, Zürich, Switzerland

Filed May 22, 1978, Ser. No. 908,170
Claims priority, application Switzerland, Jun. 2, 1977, 6774/77
Int. Cl.[2] B21B *31/32*
U.S. Cl. 29—113 AD **6 Claims**



1. A pressure element for a controlled deflection roll, comprising:

a substantially cylindrical piston section intended to be guided in a cylinder bore having a cylinder chamber of a stationary support;

a contact section merging with said piston section and intended to bear against an inner surface of a roll shell rotatable about the support;

a contact surface provided for the contact section;

said contact surface comprising a section of a cylinder surface and provided with at least three hydrostatic bearing pockets;

said bearing pockets being provided with channels for flow communicating said bearing pockets with a surface of the piston section located in the cylinder chamber of the related cylinder bore;

said piston section having a lengthwise axis and a peripheral surface;

at least one of said channels possessing at least one portion which extends from a location at least near to said peripheral surface of the piston section at an inclination with respect to the lengthwise axis of said piston section and towards a location situated closer to said lengthwise axis; and

said channel portion having a mouth disposed at least near to the peripheral surface of the piston section and at a location situated essentially furthest from the plane of the axes of the contact surface and the piston section.

4,186,473

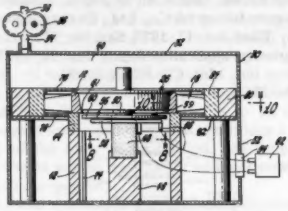
TURBINE ROTOR FABRICATION BY THERMAL METHODS

Kenneth R. Cross, Lebanon, and Bruce A. Ewing, Martinsville, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 14, 1978, Ser. No. 933,262
Int. Cl.[2] B23P *15/04;* B23R *13/00*
U.S. Cl. 29—156.8 R **2 Claims**

1. A method for fabricating a hybrid, dual property wheel assembly comprising the steps of preforming a plurality of blade elements of a first predetermined highly solidified alloy material having a base, forming said blade elements into a bladed ring with a large diameter central opening, thereafter machining said opening to precise inside diameter on the bladed ring, preforming a metal disc with a controlled OD, fitting the bladed ring to the outer diameter of the metal disc to form front and rear face joint lines, radio frequency power heating said joined disc by placing a radio frequency induction power concentrator coil assembly adjacent the disc to cause the disc to constitute the secondary coil of a step-down transformer thereby to produce selective heating to cause it to

thermally grow into radially pressed contact with the inside diameter at an interface therebetween, maintaining the outer surfaces of said radially pressed disc and bladed ring and the interface thereof under continuous vacuum and supplying



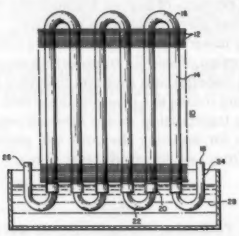
radio frequency power to said disc to heat it by induction heating to maintain a diffusion bond temperature between said disc and said bladed ring whereby the parts are maintained at a process diffusion temperature sufficient to cause bond metal growth across the interface between the joined parts.

4,186,474

METHOD OF MAKING HEAT EXCHANGER COIL

Louis P. Hine, Alameda, Calif., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 7, 1976, Ser. No. 693,587
Int. Cl.[2] B23K *1/06, 1/08*
U.S. Cl. 29—157.3 A **6 Claims**



1. In the method of making a fin and tube heat exchange coil comprised of parallel aluminum fins with aligned apertures therein, aluminum hairpin tubes extending through the apertures and with their bight portions at one end of the coil and their open ends extending beyond the last fin at the other end of the coil, aluminum return bends telescopically fitted in the open ends of some of said hairpin tubes at said other end of the coil, and copper inlet tube means and copper outlet tube means fitted telescopically in the open ends of others of said hairpin tubes at the other end of the coil, the steps of:

assembling the parts recited above, with the copper inlet tube means and the copper outlet tube means each having a generally U-shape and disposed with their legs remote from their telescopically connected ends extending through a plane corresponding to the level of the surface of a solder bath when said other end of the coil is immersed in a solder bath to a predetermined depth; and

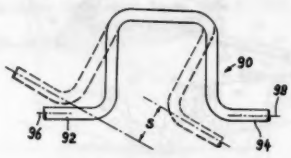
immersing said other end of said coil to said predetermined depth in an ultrasonic solder bath to effect soldering of the telescopic joints situate in the bath thereby forming bonds between the aluminum return bends and the aluminum hairpin tubes and between the copper inlet and outlet tubes and the aluminum hairpin tubes.

4,186,475

METHOD AND MEANS FOR RAPID REPLACEMENT OF DAMAGED PIPE SECTIONS

Arne Jönsson, Torshalla, Sweden, assignor to NYBY Bruk AB, Sweden

Division of Ser. No. 427125, Dec. 21, 1973, abandoned. This application Nov. 4, 1976, Ser. No. 738,900
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1972, 2263002
Int. Cl.[2] B23P *7/00*
U.S. Cl. 138—97 **1 Claim**



1. A method for rapidly repairing damaged portions of conduits and pipes which are difficult or impossible to weld, such as oil pipes, in particular on oil tankers, and long-distance heating pipes, water, gas or similar supply pipes, in particular of large diameter, said method comprising storing replacement pipe sections in the vicinity of the pipe to be repaired, each replacement pipe section having two substantially straight end portions and a generally U-shaped intermediate section formed by a plurality of substantially right-angular bends, and the method further comprising:

cutting out the damaged portion of a pipe to be repaired such that the pipe ends so formed are offset parallel to each other,

plastically deforming two interior bends of said U-shaped intermediate segment by equal angular amounts in the same direction so that facing legs of said U-shaped segment remain parallel until the two straight end portions are offset parallel to each other by an amount equal to that of the pipe ends of the damaged pipe,

inserting the plastically deformed replacement pipe section between the pipe ends of the damaged pipe, and

establishing a sealed connection between said straight end portions and the pipe ends of the damaged pipe by quick-connect coupling unions.

4,186,476

METHOD FOR PRECISE FITTING OF MOTOR VEHICLE FRONT END SHEET METAL

Alex C. Mair, and Stephen A. Mair, both of Bloomfield Hills, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 13, 1978, Ser. No. 942,052
Int. Cl.[2] B23P *11/00;* **B23Q** *3/00;* **B62D** *25/10*
U.S. Cl. 29—407 **3 Claims**

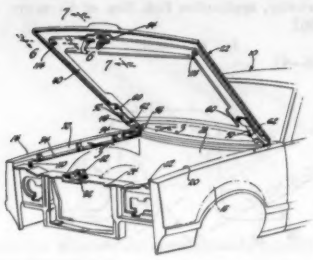
1. In a motor vehicle body having a front end assembly including a pair of laterally spaced fenders, a header extending transversely between the fenders, a hood, a pair of hinges mounting the rearward end of the hood on the fenders to permit pivotal movement of the hood between open and closed positions, a striker at the forward end of the hood cooperable with a latch mounted on the header to latch the hood in the closed position, and adjustable screws mounted on the header to engage and support the forward undersurface of the hood, a method of precisely aligning and centering the outer appearance surfaces of the hood relative the adjacent appearance surfaces of the fenders and header comprising the steps of:

attaching the striker to the hood at a precise transverse and vertical position relative the outer appearance surfaces of the hood;

machining the undersurface of the hood engageable by the

adjustable screws to a precise vertical height relative the outer appearance surface of the hood;

attaching the hood latch to the header at a precise vertical and transverse location relative the outer appearance surfaces of the fenders and header;



adjusting the adjustable screws to a precise vertical height relative the outer appearance surfaces of the fenders and header;

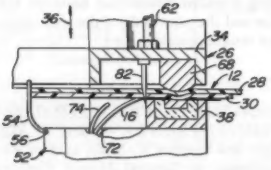
and attaching the hood hinges to the hood and the fenders at locations establishing a precise longitudinal location of the hood relative the fenders and header.

4,186,477

CASH REGISTER BAG SEALING SYSTEM AND METHOD

Susan E. Cary, Rte. 2, Box 112, Morgan Rd., Hollywood, Md. 20636, and Jesse C. Bunch, 815 Thayer Ave., #1630, Silver Spring, Md. 20910

Filed May 12, 1978, Ser. No. 905,194
Int. Cl.[2] B23P *11/00*
U.S. Cl. 29—432 **23 Claims**



1. A cash register system including a cash register for totaling a plurality of transactions and providing a receipt therefor, said receipt being expelled from said cash register, wherein the improvement comprises:

(a) means for sealing a bag in sealable relation subsequent to said totaling of said plurality of said transactions, said sealing means being coupled to said cash register; and,

(b) means for securing said receipt to said bag substantially simultaneous with said bag sealing, said securing means being secured to said sealing means.

15. A method of sealing a sealable bag coupled to a cash register and coupling said bag to a receipt ejected from said cash register, including the steps of:

(a) inserting said bag within a sealing mechanism coupled to said cash register;

(b) locating said bag adjacent said receipt;

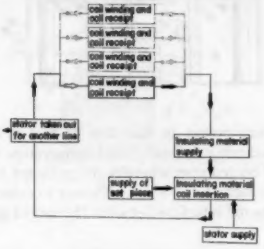
(c) simultaneously sealing said bag and securing said receipt to said bag.

4,186,478

METHOD OF MANUFACTURING STATORS FOR ELECTRICAL MACHINES OR THE LIKE AND APPARATUS EMPLOYED THEREFOR

Tokuhito Hamane, Hirakata; Kinoshita Toshio, Katano, and Masafumi Kihira, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 17, 1978, Ser. No. 870,082
Claims priority, application Japan, Jan. 18, 1977, 52-4582
Int. Cl.[2] H02K *15/04*
U.S. Cl. 29—596 **10 Claims**


coil winding and coil receipt
coil winding and coil receipt
coil winding and coil receipt
coil winding and coil receipt
stator taken out for another line
insulating material supply
supply of set piece
insulating material coil insertion
stator supply

1. An apparatus for manufacturing stators of electrical machines and the like which comprises:

a plurality of coil inserting jigs;

a jig transporting means having a plurality of coil receiving portions for transporting said jigs in parallel and a further portion for receiving said jigs from said coil receiving portions and transporting them in series;

a plurality of coil winding means, one along each of said coil receiving portions of said jig transporting means for winding coils and placing them on said jigs;

an insulating material inserting means at a position along said further portion of said jig transporting means for inserting insulating material into said coil inserting jigs; and

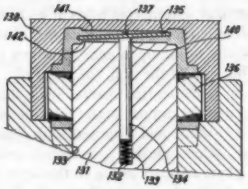
a coil inserting means at a position along said further portion of said jig transporting means downstream of said inserting means for inserting the coils and pieces of insulating material from said jigs into stator cores.

4,186,479

PROCESS FOR MANUFACTURING ROTORS FOR IN-OUT ELECTRIC MOTORS

Giorgio Gutris, 231.6.2 Avenida de 27 de Enero, Premia de Mar, Spain

Filed Jun. 8, 1977, Ser. No. 804,754
Claims priority, application Italy, Jun. 16, 1976, 24353 A/76
Int. Cl.[2] H02K *15/02*
U.S. Cl. 29—598 **7 Claims**



1. A process for manufacturing a rotor for an in-out electric motor, said rotor being of the type including ferromagnetic elements, a shaft and a cup-like shield connecting said ferromagnetic elements to said shaft, said process comprising:

defining a mold including a mold cavity having a longitudinal axis and a bore extending coaxially of said longitudinal axis;

positioning within said mold cavity ferromagnetic elements of a rotor to be formed, such that said ferromagnetic elements extend coaxially of said longitudinal axis of said mold cavity;

providing an assembly of a shaft of the rotor to be formed and a discoidal head rigidly fixed to said shaft;

positioning said assembly within said mold cavity, such that said shaft extends into said bore with minimal play therebetween and extends coaxially of said ferromagnetic elements and of said longitudinal axis of said mold cavity, such that a remaining free space portion within said mold cavity defines the configuration of a to be cast metal component at least a part of which constitutes a portion of a shield of the rotor to be formed, and such that said discoidal head will at least partly be incorporated within said metal component;

maintaining said assembly in a desired axial alignment within said mold cavity, such that said shaft remains coaxial with said ferromagnetic elements and with said longitudinal axis of said mold cavity, by virtue of said shaft within said bore and by exerting on said assembly oppositely directed linear forces extending in a single straight line only, said single straight line extending parallel to said longitudinal axis of said mold cavity; and

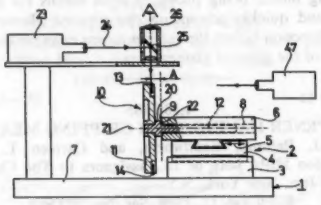
casting metal within said remaining free space portion within said mold cavity, while maintaining said desired axial alignment of said assembly, thereby forming said metal component at least partially enclosing said discoidal head, and joining said shaft to said ferromagnetic elements while maintaining said shaft and said ferromagnetic elements coaxial with each other.

4,186,480

METHOD OF MANUFACTURING A ROTATABLE MAGNETIC HEAD ARRANGEMENT

Wolfgang Binder Kriegelstein, and Erich Berger, both of Vienna, Austria, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 14, 1977, Ser. No. 860,282
Claims priority, application Austria, Dec. 22, 1976, 9536/76
Int. Cl.[2] G11B *5/42*
U.S. Cl. 29—603 **4 Claims**



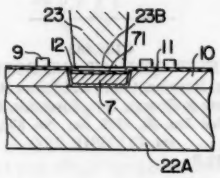
1. A method of manufacturing a rotatable magnetic head arrangement for recording and/or playback apparatus for signals having a wide frequency spectrum such as video signals, in which at least one magnetic head comprising a plate-shaped magnetic circuit having a tape contact face, an operative gap and a coil window and a coil passing through the coil window, is provided on a disc-shaped carrier in a given position with respect to a reference surface provided on the carrier and extending at right angles to its axis of rotation, which comprises: fixing a reference level for the operative gap of a magnetic head at a given distance from the reference surface on the carrier which falls essentially in the central area of the operative gap of the magnetic head viewed in the gap width, and then with reference to this level removing so much material by means of a laser beam directed on the tape contact face of the magnetic head at the area of the operative gap first from a major surface of the plate-shaped magnetic circuit bounding the operative gap in the direction of the gap width and then from the oppositely located major surface over the whole gap height, that the gap width of the operative gap is reduced to a given size by the formation of two oppositely located groove-shaped recesses.

4,186,481

METHOD FOR FABRICATION OF REAR CHIP FOR HALL EFFECT MAGNETIC HEAD

Takaharu Noguchi; Takao Ketori; Kohji Tamura, all of Yokohama; Tetsu Oi, Tokyo, and Yutaka Miyoshi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sep. 5, 1978, Ser. No. 939,210
Claims priority, application Japan, Sep. 5, 1977, 52-105824
Int. Cl.[2] G11B *5/42*
U.S. Cl. 29—603 **1 Claim**



1. In a method for fabricating a rear chip for a Hall effect magnetic head, comprising steps of producing a rear core substrate block with a multiplicity of Hall elements embedded therein in predetermined spacial relation to each other, producing a rear core block with a multiplicity of rear core protrusions, securing said rear core block onto said rear core substrate block through a member of non-magnetic material in such a manner that said rear core protrusions are in opposed relation with said Hall elements respectively, and cutting into a multiplicity of rear chips the assembly including said rear core substrate block and said rear core block; the improvement further comprising steps of forming a plurality of rear core supports between said rear core protrusions respectively in such a manner that the bottoms of said rear core supports are in the same plane as the bottoms of said rear core protrusions, securing said rear core block to said rear core substrate block in such a manner that the width of the bottom of each of said rear core protrusions is substantially equal to the width near a Hall output terminal of each of said Hall elements along the control current flow therein and that the bottom of each of said rear core protrusions is in opposed relation to each of said Hall elements, said rear core supports preventing any pressure from being applied to said Hall elements, and removing said rear core supports.

4,186,482

TOOL AND METHOD FOR INSTALLING FLEXIBLE TUBING IN A MULTI-CAPSULE REED RELAY SWITCHING ASSEMBLY

James V. Koppensteiner, Chicago; Khaja M. Jameel, Glen Ellyn; Charles K. Kubik, Brookfield, and George Len, Arlington Heights, all of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

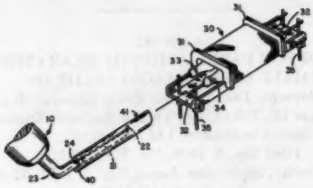
Filed Oct. 2, 1978, Ser. No. 947,978
Int. Cl.[2] H01H *11/00*
U.S. Cl. 29—622 **6 Claims**

1. A tool for inserting a flexible tube including inner and outer walls between two or more parallel and spaced apart glass encapsulated reed switches of a reed relay switching assembly, said tool comprising:

a rigid, horizontal member including a rectangular central portion and a billhook shaped frontal portion;

said tool slidably inserted into said tubing, said central portion adapted to vertically elongate said tubing and said

billhook upon application of manual pressure to said tubing outer wall partially penetrating said tubing inner wall



allowing for insertion of said tubing between said reed switches.

4,186,483

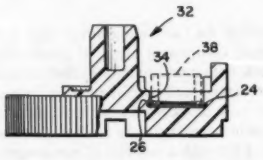
POTENTIOMETER CONTACT AND ROTOR ASSEMBLY

David E. Laube, Banning, Calif., and Loran R. Simpson, Ames, Iowa, assignors to Bourns, Inc., Riverside, Calif.

Filed Jan. 30, 1978, Ser. No. 873,306

Int. Cl.[2] H01R *9/00*

U.S. Cl. 29—630 B **2 Claims**



1. A method of fabricating a potentiometer contact wiper and rotor assembly comprising the steps of:

forming progression-locator holes in a support strip;

forming wiper support plates in a portion of said support strip in one-to-one relationship to said progression-locator holes;

forming tab strips in another portion of said support strip;

defining first projecting interference tabs in relation to said tab strips;

forming at least one radius-truncated cone projection in each of said wiper support plates;

forming at least one radius-truncated cone projection in each of said tab strips;

welding a multiwire contact strip to said wiper support plates and said tab strips at said radius-truncated cone projections;

cutting said multiwire contact strip at said wiper support plates;

shearing said wiper support plates from said tab strips so as to leave a projecting strip of said multiwire contact strip to form wiper blanks;

forming a contact row in said projecting strip of each of said wiper blanks;

forming a wiper contact spring in said potentiometer contact wiper by progressive bending of said projecting a strip into an acute angle in each of said wiper blanks;

locating said potentiometer contact wiper by means of said progression-locator holes;

shearing said contact wiper from said support strip so as to form second projecting interference tabs;

inserting said potentiometer contact wiper into a rotor blank having a slot;

retaining said potentiometer contact wiper in said rotor blank by

forcing said potentiometer contact wiper into said slot in said rotor blank so as to bend up said first and second projecting interference tabs causing an interference fit between said projecting interference tabs and said slot in said rotor blank.

4,186,484

CUTTING HAND TOOL

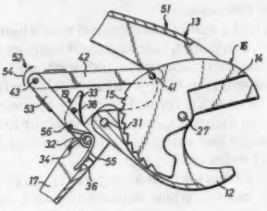
Minoru Tanaka, Higashi-Osaka, Japan, assignor to Hanazono Kogu Kabushiki Kaisha, Higashi-Osaka, Japan

Filed May 31, 1978, Ser. No. 911,148

Claims priority, application Japan, Sep. 22, 1977, 52-128521[U]

Int. Cl.[2] B23D *21/06*; B26D *3/16*

U.S. Cl. 30—92 **7 Claims**



1. A cutting hand tool comprising a stationary handle having a receiving portion at its head, a movable handle pivoted at its one end to the head of the stationary handle and extending in opposed relation to the stationary handle so as to be grasped by the hand, a pivoted element pivoted to the head of the stationary handle and having a cutting blade opposed to the receiving portion and a toothed segment opposed to the movable handle and having teeth arranged circumferentially of the pivoted element at specified spacing, ratchet means pivoted to the movable handle and engageable with the toothed segment of the pivoted element to intermittently advance the pivoted element in a cutting direction when the movable handle is grasped, an advancing means including a first link and a second link coupling the movable handle to the pivoted element, the advancing means being provided with means for elastically biasing and quickly advancing the pivoted element in the cutting direction before the ratchet means engages the toothed segment of the pivoted element.

4,186,485

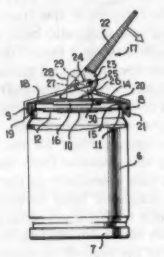
OPENER HAVING SEAM GRIPPING MEANS

Donald J. Bainton, Kenilworth, and Carmen T. Mascia, Clarendon Hills, both of Ill., assignors to The Continental Group, Inc., New York, N.Y.

Filed Jul. 12, 1978, Ser. No. 923,884

Int. Cl.[2] B67B *7/30*

U.S. Cl. 30—410 **8 Claims**



1. An opener particularly adapted for opening prescored end units of cans secured to can bodies by an end seam, said opener

comprising a retainer adapted to overlie an end unit of a can and having means for interlocking engagement with an end seam of a can, a separately formed cover carried by said retainer for overlying an end unit, a blade depending from said cover for movement therewith relative to said retainer and being centered relative to said retainer for alignment with a score in the end unit to be opened, said blade having a circular free edge and actuator means connected to said retainer and said cover for applying a force on said cover urging said cover axially away from said retainer toward an underlying end unit.

4,186,486

DENTAL PROSTHESIS

Maurice Gordon, 15 Stuyvesant Cir. West, South Setauket, N.Y. 11733

Filed Nov. 4, 1977, Ser. No. 848,596
Int. Cl.² A61C *13/00*
U.S. Cl. 433—201 **7 Claims**

1. A dental prosthesis comprising a root portion and a crown portion, said root portion comprising a root shaped structure of non-metallic, pliable material suitable for shaping by use of dental tools, said structure having outer surfaces, an inner hollow cavity and openings connecting said surfaces and said cavity, and a bone growth stimulating biochemical matrix in said openings and said cavity.

4,186,487

ORTHODONTIC ARCH WIRE

Melvin Wallshein, 8645 Bay Pkway., Brooklyn, N.Y. 11214

Filed May 2, 1977, Ser. No. 792,866
Int. Cl.² A61C *7/00*
U.S. Cl. 433—20 **41 Claims**

1. An orthodontic arch wire having a longitudinal axis, comprising:

at least one strand having first and second cross-sectional dimensions, one cross-sectional dimension being greater than the other, said at least one strand being spirally wound along said longitudinal axis so that adjacent turns of said spiral are separated from each other and such that said greater cross-sectional dimension of said at least one strand spirally winds longitudinally along said arch wire,

said separation between adjacent turns of said at least one strand defining a substantially helically winding void space along said longitudinal axis, at least a portion of each helically winding void space being empty and devoid of wire material throughout the length of the wound arch wire, and

said wound arch wire having a maximum common outer dimension no greater than approximately 0.045 inches and said at least one strand being made from a material sufficiently elastic to permit bending of the wound arch wire along the length thereof and to provide predetermined stiffness over a long length thereof so as to serve as an orthodontic arch wire.

4,186,488

ORTHODONTIC BRACKET WITH MULTI-LAYER BASE

Melvin Wallshein, 8645 Bay Pkwy., Brooklyn, N.Y. 11214

Filed Nov. 11, 1977, Ser. No. 850,718
Int. Cl.² A61C *7/00*
U.S. Cl. 433—8 **11 Claims**

1. An orthodontic bracket comprising:

a substantially non-resilient bracket member having a base and an arch wire receiving opening formed in a surface of said bracket; and

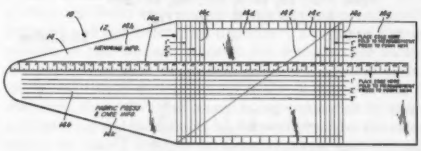
a generally ring-shaped mounting layer of resilient material secured to said base of said bracket member and adapted to be mounted to a tooth or the like, said mounting layer having peripheral edges which extend at least adjacent to the periphery of said base of said bracket and a void space interior of said peripheral edges which underlies said base of said bracket.

4,186,489

MEASURING, PRESSING AND HEMMING DEVICE

Adele Vigilante, 81 Stevenson St., Lynbrook, N.Y. 11563, and Louise V. Vicesuinci, 147-26 Sanford Ave., Flushing, N.Y. 11355

Filed May 25, 1978, Ser. No. 909,288
Int. Cl.² A41H *1/00*
U.S. Cl. 33—2 H **1 Claim**

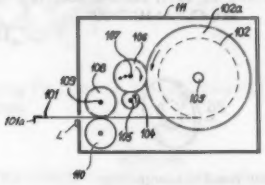


1. A measuring guide device for facilitating the performance of operations upon planar piece goods comprising: a planar blank of flexible material having a surface adapted to accept printing; a guiding pattern printed upon said surface, said pattern including a measuring ruler extending along a first generally centrally disposed axis, said measuring ruler including two parallel longitudinally extending lines enclosing indicia lines, a first axis hemming guide formed by a plurality of lines parallel and adjacent to the axis of said ruler and mutually spaced at substantially equal increments, a pair of second axis hemming guides extending transverse to and intersecting said first axis hemming guide, each including a plurality of parallel lines spaced at substantially equal increments, each of said pair of hemming guides being spaced apart a distance such that a substantial rectangular clear area is formed therebetween, a single diagonally oriented line extending across said guiding pattern at a 45° angle relative to each of said first and second axes, and interconnecting said paid of second axis hemming guides; whereby a plurality of folding, hemming and pressing operations may be performed at the edges of a single rectangular piece of goods without substantial shifting thereof for each individual operation, and a biasing fold may be made at a proper angle relative to a hemmed edge.

4,186,490
TAPE-TYPE LINEAR MEASURING INSTRUMENT

Michel C. A. Quenot, Ornans, France, assignor to Stanley-Mabo, France

Filed Jun. 13, 1978, Ser. No. 915,218
Claims priority, application France, Jun. 16, 1977, 77 19054; Jun. 16, 1977, 77 19055
Int. Cl.[2] G01B 3/12, 5/02
U.S. Cl. 33—139 29 Claims

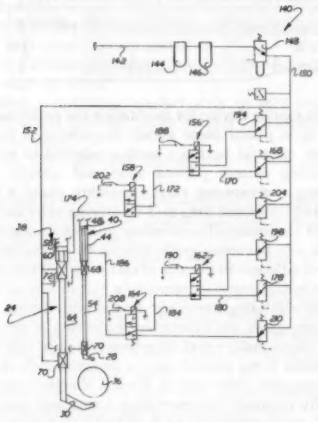


1. A tape-type linear measuring instrument comprising an instrument case, a measuring tape, a winding drum for said measuring tape, means for winding and unwinding said tape on or from said winding drum, a speed reducer having a high speed shaft and a lower speed shaft, a wheel coupled with the low speed shaft of said speed reducer and engaging said measuring tape so as to rotate in synchronishm with translational movement of said tape, an electronic pick-up comprising a movable element coupled with the high speed shaft of said speed reducer and provided with reference marks disposed at spaced intervals and a pick-up element for sensing passage of said reference marks, an electronic counter connected with and responsive to said pick-up, and means for digitally displaying the reading of said counter.

4,186,491
GAUGE ASSEMBLY

Jerome R. Shawke, Hudson, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed Mar. 16, 1978, Ser. No. 887,207
Int. Cl.[2] G01B 7/02, 7/12
U.S. Cl. 33—143 L 10 Claims

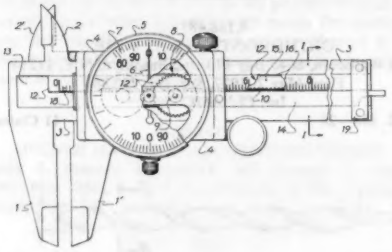


1. A gauge assembly for use in measuring a workpiece, said gauge assembly comprising upper and lower gauge members which are movable relative to each other, said upper gauge member being movable between a raised position spaced apart from the workpiece and a lowered position engaging an upper portion of the workpiece, said lower gauge member being movable between a lowered position spaced apart from the workpiece and a raised position engaging a lower portion of the workpiece, first fluid pressure responsive means connected with said upper gauge member for moving said upper gauge member between its raised and lowered positions, second fluid pressure responsive means connected with said lower gauge member for moving said lower gauge member between its raised and lowered positions, first control means for directing to said first pressure responsive means a first fluid pressure to effect movement of said upper gauge member from its lowered position to its raised position, for directing to said first pressure responsive means a second fluid pressure which is less than said first fluid pressure to effect movement of said upper gauge member from its raised position to its lowered position, and for directing to said first pressure responsive means a third fluid pressure which is less than said second fluid pressure to effect engagement of the workpiece by said upper gauge member with a predetermined gauging force, and second control means for directing to said second pressure responsive means a fourth fluid pressure to effect movement of said lower gauge member from its raised position to its lowered position, for directing to said second pressure responsive means a fifth fluid pressure which is greater than said fourth fluid pressure to effect movement of said lower gauge member from its lowered position to its raised position, and for directing to said second pressure responsive means a sixth fluid pressure which is greater than said fifth fluid pressure to effect engagement of the workpiece by said lower gauge member with a predetermined gauging force.

4,186,492
DIAL MEASUREMENT GAUGE

Giovanni Gattesco, Crissier, Switzerland, assignor to Tesa, S.A., Renens, Switzerland

Filed Nov. 6, 1978, Ser. No. 958,114
Claims priority, application Switzerland, Nov. 9, 1977, 13634/77
Int. Cl.[2] G01B 5/02
U.S. Cl. 33—147 T 3 Claims



1. A dial measurement gauge comprising:
(a) a linear slideway;
(b) a fixed feeler rigidly connected with said linear slideway;
(c) a rack formed of a first profiled means comprising a toothing therealong, said rack fastened along the slideway;
(d) a slide block movable along the slideway;
(e) a movable feeler, said feeler rigidly connected to the slide block;
(f) a reading dial rigidly connected to the slide block, said reading dial having a movable pointer;
(g) a gear transmission multiplier mechanism fastened to the slide block, said gear mechanism engaging the rack for controlling the movable pointer of said reading dial;
(h) a linear depth feeler gauge connected to the slide block, said depth feeler gauge movable along the slideway opposite the toothing of the rack; and
(i) a second profiled means rigidly assembled to said first

profiled rack forming means for covering the exposed side of the toothing thereof over at least its entire length, said second profiled means bearing with free sliding action against said depth feeler gauge.

4,186,493

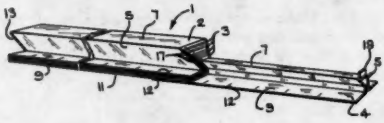
TELESCOPING CARPENTER'S SCALE

Amir U. Khan, c/o The International Rice Research Institute, P.O. Box 1237, Islamabad, Pakistan; Habib U. Khan, 705 Waite Rd., Maumee, Ohio 43537, and Ahamed A. Amid, 299 Rivers End, Gahanna, Ohio 43230

Filed Aug. 16, 1978, Ser. No. 934,177

Int. Cl.[2] G01B *3/08*

U.S. Cl. 33—161 **3 Claims**



1. A straight edge comprising a plurality of longitudinal members positioned together in a telescoping relationship, one of said members defining an outer member and another of said members defining an inner member, each of said members having at least one longitudinal edge, said edges forming a substantially straight edge throughout the telescoping range of said members and graduation means along said edges for indicating a measurement, each of said longitudinal members having sidewalls, a top wall connecting said sidewalls and at least one base portion extending outwardly from one of said sidewalls, said base portions terminating in said longitudinal straight edges, said outer member having an end wall that extends from said top wall to said base portion of said outer member to substantially enclose one end of said straight edge, said inner member having a projection located on an end thereof spaced apart from said end wall of said outer longitudinal member, said projection extending from said end of said inner member in a direction toward said top wall of said outer member, and wherein each longitudinal member except said outer longitudinal member has a tab located at the end of such member closest to said end wall of said outer member, said tabs extending upwardly from said ends of said members and abutting said top wall of the adjacent outer one of said longitudinal members.

3. A straight edge comprising at least three longitudinal members positioned together in slidable telescoping relationship to move between extended and collapsed positions, one of said members defining an outer member, another of said members defining an inner member and the remainder of said members defining intermediate members between said inner and outer members, each of said members having at least one longitudinal edge, said edges forming a straight edge through the telescoping range of said members, graduation means along said edges for indicating a measurement, means for limiting telescoping of said members in one direction to confine said intermediate and inner members within said outer member when in the collapsed position, tab means on each of said members extending between each two adjacent members for limiting telescoping of said members in the other direction to the extended position, said tab means between each two adjacent members projecting in opposite directions to abut when said members are telescoped to the extended position, and a projection located on said inner member, said projection facilitating extending the straight edge from the collapsed position to the extended position.

4,186,494

DEVICE FOR ACCURATE MEASUREMENT OF THE SHAPE OF A SUBSTANTIALLY CYLINDRICAL SURFACE

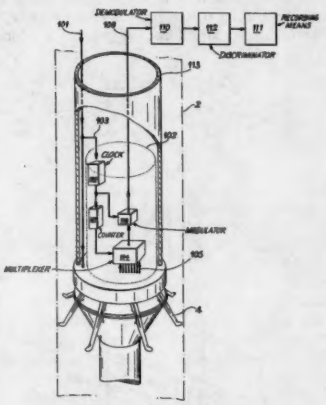
Peruchon Edouard, and Pierre Rabischong, both of Montpellier, France, assignors to Societe Nationale Elf Aquitaine (Production), Courbevoie, France

Filed Mar. 6, 1978, Ser. No. 883,794

Claims priority, application France, Mar. 10, 1977, 77 07111

Int. Cl.[2] G01B *7/12, 7/28*

U.S. Cl. 33—178 E **10 Claims**



1. A device for measuring the precise shape of a substantially cylindrical surface comprising a plurality of feeler arms connected to a central frame and disposed at uniform angular intervals around said frame and electrical detectors for measuring the position of the free end of each feeler arm as well as means for maintaining each arm in contact with the cylindrical surface to be measured, means of electromagnetic type for placing said feeler arms in a withdrawn position and means for displacing all the feeler arms together in a common movement relative to said surface, wherein the detectors for measuring the position of each feeler arm end are electrical means for taking differential measurements of the positions of said feeler arm ends, these electrical means being connected to means for multiplexing and modulating signals delivered by the electrical means for taking differential measurements, said mutiplexing and modulating means being coupled with means for demodulating the modulated signals which are connected to recording means through a discriminator.

4,186,495

APPARATUS FOR FREEZE DRYING OF GAS, ESPECIALLY COMPRESSED AIR

Horst Remberg, Berliner Str. 5, 4043 Holzheim, and Werner Frischmann, Wilhelmshohe 37a, 5810 Witten-Stockum, both of Fed. Rep. of Germany

Filed Nov. 30, 1977, Ser. No. 856,109

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1976, 2654253; Dec. 14, 1976, 2656483; Dec. 21, 1976, 2657858; Jan. 12, 1977, 2701006

Int. Cl.[2] F26B *13/30*

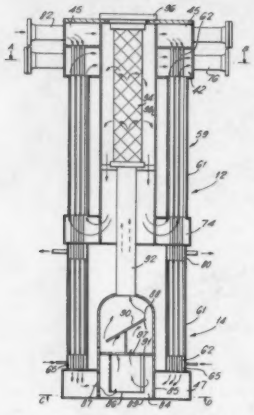
U.S. Cl. 34—92 **50 Claims**

1. Apparatus for freeze drying of gas, particularly compressed air, comprising a gas to gas heat exchanger and a gas to refrigerant heat exchanger each in a substantially vertical arrangement,

each exchanger having a first and a second volume in heat exchange relationship but without fluid communication with each other and each volume having an upper portion and a lower portion,

the gas to gas heat exchanger having an inlet to a first header for warm gas to be dried, the first header being in fluid communication with the upper portion of the first volume, a first connection for fluid communication with the lower portion of the first volume, a second header for cooled gas, the second header being in fluid communication with the lower portion of the second volume, and an outlet from a third header for warm dried gas, the third header being in fluid communication with the upper portion of the second volume,

the gas to refrigerant heat exchanger having a first connection for cool gas to be dried, the first connection being in fluid communication with the upper portion of the first volume of the gas to refrigerant heat exchanger, a second connection for dried cooled gas, the second connection



being in fluid communication with the lower portion of the first volume, an inlet for refrigerant, the inlet being in fluid communication with the lower portion of the second volume, and an outlet for refrigerant, the outlet being in fluid communication with the upper portion of the second volume,

the first header of the gas to gas heat exchanger being in fluid communication with the first connection of the gas to refrigerant heat exchanger being in fluid communication with the second header of the gas to gas heat exchanger, at least the gas to gas heat exchanger having exchanger elements which consist of an outer pipe and an inner core pipe located therein, and means including metal sheet meander-shaped in cross-section being arranged in heat contact with at least one of the outer pipe and the inner core pipe for increasing heat transfer.

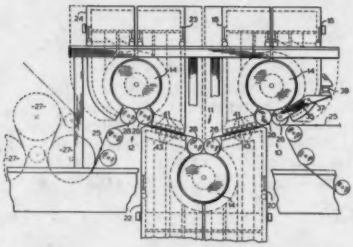
4,186,496

WEB DRIER SECTION

Zoltan Beke, Lasalle, and George W. Kukla, Dollard des Ormoux, both of Canada, assignors to Dominion Engineering Works Limited, Lachine, Canada

Continuation of Ser. No. 777,770, Mar. 15, 1977, abandoned.
This application Oct. 6, 1978, Ser. No. 949,222
Int. Cl.[2] F26B *13/08*
U.S. Cl. 34—114 **6 Claims**

1. A drier for a fragile, light weight paper web, having at least two drier drums in spaced apart relation, hood means positioned about portions of the periphery of the respective drums and extending oppositely in spaced apart relation from each other to provide a web draw passage located between the opposed hood means, having an off-going web guide and an on-going web guide located at the ends of the passage a plurality of floater header means located on opposite sides of the web passage in aligned mutually opposing relation extending substantially the full length of the passage, having air jet means directed substantially normally to the opposed surfaces of the web, and return flow air passage means spaced along the passage to receive exhaust air therefrom to provide in operation a



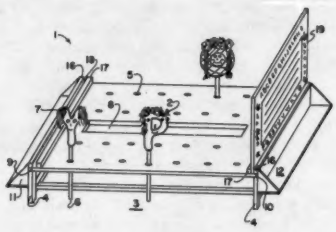
balanced air cushion open draw applying substantially balanced web-stabilizing pneumatic forces to the opposite surfaces of the web to permit high speed passage thereof in non-fluttering relation along the draw passage.

4,186,497

ASSEMBLY FOR FACILITATING TEACHING READING

Bernadette C. Legoria, 606 Farris Dr., Hammond, La. 70401

Filed Feb. 13, 1978, Ser. No. 877,008
Int. Cl.[2] G09B *1/10*
U.S. Cl. 35—35 R **1 Claim**



1. An assembly of teaching aids utilized in reading instructions comprising in combination:

(a) a learning station;

(b) twenty-six (26) alphabet doll models having upper portions shaped like different alphabet letters, said alphabet doll models shaped like vowels are constructed having a common design pattern and wherein said alphabet doll models shaped like consonants are constructed having a different common design pattern, said alphabet doll models are color coded to the initial sounds of color words;

(c) twenty-six (26) hand puppet models, said hand puppet models are color and pattern coded to match their corresponding alphabet doll models; and

(d) at least three (3) different character doll models.

4,186,498

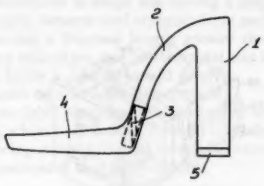
SOLE WITH HIGH HEEL FOR WOMAN FOOTWEAR, CONSISTING OF A PLASTIC MATERIAL MONOBLOCK HAVING A RIGID AND A FLEXIBLE PART

Ida Weber, Lugano, Switzerland, assignor to B.M.C.-Brevets-Marques-Chaussures S.A., Zug, Switzerland

Filed Nov. 3, 1977, Ser. No. 848,093
Int. Cl.[2] A43B *13/04, 13/28*
U.S. Cl. 36—32 R **1 Claim**

1. An integral sole, shank and heel monoblock for women footwear comprising a sole portion, a high heel portion and a

shank portion between the sole portion and the heel portion, the shank and the heel portion consisting of rigid plastic material, the sole portion consisting of flexible plastic material, the end of the shank portion opposite the end which is integral



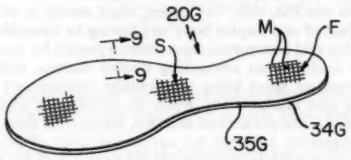
with the heel portion having been provided with through-holes in oblique direction with resect to the shank, the flexible plastic material of the sole portion having filled the through-holes.

4,186,499

CONSTRUCTION FOR ABSORBING ODORS CAUSED BY PERSPIRATION AND METHOD OF MAKING SAME

Anthony J. Massok, Jr., Richmond, and James P. Nolan, Chester, both of Va., assignors to Dayco Corporation, Dayton, Ohio

Filed May 22, 1978, Ser. No. 908,047
Int. Cl.[2] A43B *13/38, 13/40*
U.S. Cl. 36—44 **19 Claims**



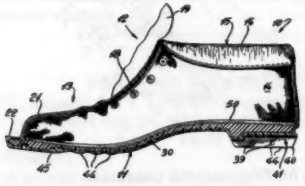
1. A shoe insole for absorbing odors caused by foot perspiration comprising, a fabric having a plurality of members comprising an exposed surface thereof, each of said members comprising an odor-absorbing material, said odor-absorbing material consisting of a carbonaceous material, said members being freely accessible on said exposed surface to said perspiration thereby assuring unimpeded action by the odor-absorbing material thereof, and a substrate fixed against said fabric on the surface thereof opposite from said exposed surface.

4,186,500

MOLDED CROSS-COUNTRY SKI BOOT

Otto Salzman, Dorval, Canada, assignor to Tyrol Shoe Co. Ltd., Montreal, Canada

Filed Apr. 27, 1978, Ser. No. 900,662
Int. Cl.[2] A43B *5/04*
U.S. Cl. 36—117 **9 Claims**



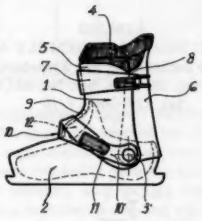
1. A cross-country ski boot comprising a sole section and an upper section, said sole section and at least the lower marginal area of said upper section being integrally formed of plastics material, said upper section having a toe portion in a front part thereof and a heel portion in a rear part thereof, a foot entrance opening above said heel portion, securement means associated with said foot entrance opening to secure a foot in said boot, a liner within said upper section over an inner face of said sole section and upper section, said sole section being molded on a sole plate insert having a higher stiffness property than said plastics material to impart stiffness and torsional rigidity to said sole while permitting flexing on said sole along an area transverse to the longitudinal axis of said sole section intermediate a front foot and a rear heel portion of said sole to permit said heel portion of said boot to be lifted off a surface while said toe portion of said boot is immovably secured to said surface.

4,186,501

SKI BOOT

Georges P. J. Salomon, Annecy, France, assignor to S.A. Etablissements Francois Salomon & Fils, Annecy, France

Filed Nov. 16, 1977, Ser. No. 852,367
Int. Cl.[2] A43B *5/04*
U.S. Cl. 36—121 **9 Claims**



1. A ski boot comprising at least two parts including a lower part comprising a foot section and an upper part, means pivotably connecting the upper and lower parts, said upper part comprising a leg section including at least one part, said upper part including at least one deformation region constituted by the provision of at least one slot open from the lower periphery of the leg section and defining at least one flexible tongue to permit the two parts of the boot to cooperate with each other, and resilient means for controlling the deformation of said region, said resilient means having two states, including a first state in a position of the boot suitable for skiing in which the resilient means ensures the locking, at least towards the rear of the upper part on the lower part, and a second state in a position of the boot suitable for walking in which due solely to the operation of the resilient means, it allows at least partial elimination of the cooperation between the deformation region provided on said upper part and the lower part, as well as elimination of the aforesaid locking.

4,186,502

SCENT DISPERSING BOOT

Lloyd B. Foster, Sturgeon Bay, Wis., assignor to The Bootmakers of Sturgeon Bay, Inc., Sturgeon Bay, Wis.

Filed Apr. 10, 1978, Ser. No. 894,818
Int. Cl.[2] A43B *23/00*
U.S. Cl. 36—136 **8 Claims**

1. An improved boot construction, wherein the improvement comprises a scent dispersing means comprising:
a pocket on the exterior of said boot, and
a resilient absorbent pad adapted to be impregnated with scent and held within said pocket,
said pocket having ventilating means communicating between said pad and the exterior of said boot,
said pocket being located in a portion of said boot that

flexes as the wearer walks, said flexing of said pocket causing said pad to alternately compress and relax,

thereby causing air to circulate around said pad and through said venting means to disperse scent outside said boot.

4,186,503

GREETING CARD DISPLAY ASSEMBLY AND METHOD

Paul Fontana, 2819 Jackson St., San Francisco, Calif. 94115

Filed Aug. 28, 1978, Ser. No. 937,476

Int. Cl.[2] G09F *1/10*

U.S. Cl. 40—124.4 **7 Claims**

1. A greeting card display assembly, comprising:

(a) a plurality of straight slats of progressively decreasing lengths, each of said slats including

(i) a substantially flat top side,

(ii) a substantially flat bottom side, and

(iii) a through hole extending from said top side to said bottom side and centrally located along the length of the slat;

(b) a vertical center post extending successively through said centrally located holes of said slats such that

(i) the largest one of the said slats is nearest to the bottom of said post with the remaining slats successively decreasing in size upwardly along the length of said post,

(ii) said slats are rotatable about said post for positioning in a common plane through said post to simulate a Christmas tree in two dimensions and in angularly differing planes through said post to simulate a Christmas tree in three dimensions, and

(iii) any two adjacent slats are positioned relative to one another so that their confronting sides extend horizontally and slidably engage one another for holding a greeting card therebetween; and

(c) means for supporting said post in a vertically extending position.

4,186,504

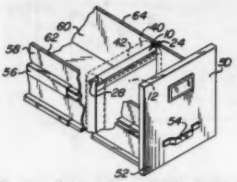
DISPLAY MARKER DEVICE

John R. Avery, 523 Detroit St., Denver, Colo. 80206

Filed Oct. 31, 1977, Ser. No. 847,060

Int. Cl.[2] B42F *21/00*

U.S. Cl. 40—359 **1 Claim**



1. A single device for providing an advertising display while supporting a bound volume and acting as a book marker, comprising:

a display body being a sheet of flat, thin material insertable between pages of the bound volume, said sheet having an elongated open ended sleeve formed along one edge, said sheet having an advertising display arranged along at least a portion of one or both sides of said sheet;

an elongated support member positioned in said sleeve, said support member having a length so that ends thereof extend beyond ends of said sheet to removably engage a rigid supporting structure so that the bound volume is supported over said elongated support member by the rigid supporting structure;

at least one flat, thin, transparent sheet sealed to an outer surface of said display body and having an openable edge so that said transparent sheet forms a pocket for receiving and enclosing an advertising display therein, said thin, transparent sheet being substantially contiguously adjacent said display body when no advertising display is housed in the pocket and said thin, transparent sheet being contiguously adjacent the advertising display when the advertising display is housed in the pocket with the advertising display being contiguously adjacent said outer surface of said display body, the combined thickness of said sheet and said display body being minimized so that the combined display body and sheet is insertable between pages of the bound volume to both support the bound volume and serve as a book marker.

4,186,505

TAB-STRIP FOR FILING SYSTEMS

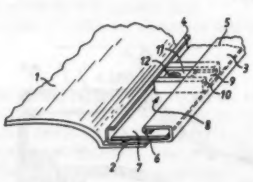
Kurt Brändel, Berlin, Fed. Rep. of Germany, assignor to Standard Sichtgerate GmbH, Fed. Rep. of Germany

Filed Apr. 17, 1978, Ser. No. 897,153

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1977, 2716746

Int. Cl.[2] B42F *21/04*

U.S. Cl. 40—360 **22 Claims**



1. A tab-strip for filing material comprising

a strip body adapted to be attached to the filing material, said strip body having elongate front and second edges, said

front edge including a guide groove facing the rest of the tab-strip,

at least one label element, said strip body having means for directly temporarily fixing said label element to said strip body independently of any other label elements if such label elements are present, said label element being generally rectangular in shape and having a length such that it fits loosely between said elongate front and second edges, and having a diagonal length greater than the distance between said edges, said label element also having a height which forms a tight fit in said guide groove,

guide means on said label element, and

at least one label positionable in said guide means, said label having a handle accessible through said label element, said label being movable by said handle between one of at least two positions in said label element.

4,186,506

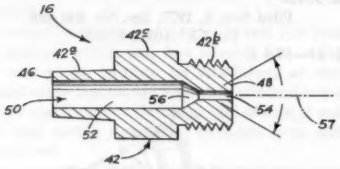
PERCUSSION CAP NIPPLE

Daniel E. Pawlak, deceased, late of Issaquah, Wash., and by Catherine J. Pawlak, personal representative, Bellevue, Wash., assignors to Michaels of Oregon Co., Portland, Oreg.

Filed Mar. 20, 1978, Ser. No. 890,617

Int. Cl.[2] F41C *27/00*

U.S. Cl. 42—83 **1 Claim**



1. A nipple usable to ignite a propellant charge in a firearm of the type employing percussive ignition caps, said nipple comprising,

an elongate body including, adjacent one end, a substantially cylindrical cap-receiving section, the outer surface of which is dimensioned to receive such caps slidingly thereon, and adjacent the other end, a mounting section, said body further including, adjacent said one and other ends, one and other end faces, respectively, which are planar and occupy substantially parallel planes,

a first cylindrical wall expanse extending from said one end face, substantially perpendicular thereto, axially through a major portion of said nipple, defining a first, larger-diameter chamber therein,

a second cylindrical wall expanse extending from said other end face, substantially perpendicular thereto, axially through a minor portion of said nipple, defining a second, smaller-diameter chamber therein, and

a conical wall expanse which tapers radially inwardly, along the axial direction approaching said other end face, at an angle of between about 25° and about 35° relative to the longitudinal axis of said nipple, said conical wall expanse defining a conical chamber joining said first and second chambers, said conical chamber having a volume greater than, and a longitudinal dimension less than, that of said second chamber.

4,186,507

PORTABLE DUCK BLIND

Arvil L. Stinnett, 712 S. 104th St., Edwardsville, Kans. 66113

Filed Aug. 24, 1977, Ser. No. 827,116

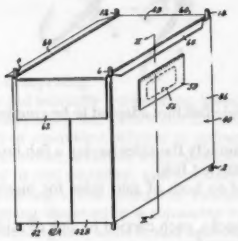
Int. Cl.[2] A01M *31/00*

U.S. Cl. 43—1 **1 Claim**

1. A portable duck blind comprising:

a. a frame of skeleton, generally rectilinear form of a size to house a hunter when in its extended use position, but being constructed of relatively pivoted elements whereby to be collapsible to a generally flat configuration for convenience of storage and transportion, comprising a pair of generally rigid, planar end walls each consisting of a pair of corner posts rigidly interconnected by cross bars extending horizontally therebetween, and a pair of side walls consisting of at least two pivoted bars extending between each pair of corresponding corner posts of said end walls, each of said pivoted bars being formed of a pair of sections pivotally joined together at their contiguous ends, and pivotally connected at their distal ends respectively to said corresponding pair of corner posts, the axes of all three of said pivotal connections being parallel with each other, and transverse to said pivoted bars and said corner posts,

b. A short stub bar rigidly affixed to each of said corner posts at each end of each of said pivoted bars, whereby to



extend in overlapping, aligned relation to the adjacent section of the associated pivoted bar when said section is disposed at right angles to the adjacent corner post,

c. locking means releasably securing said frame in said extended use position, said locking means comprising a tubular sleeve mounted for sliding movement along each of the sections of each of said pivoted bars, whereby to be movable into or out of snugly encircling relation to the associated stub bar, and

d. a cover consisting of an enclosure having side, end and top walls removably applicable over said frame when said frame is in said extended use position, whereby to form an enclosure capable of housing a hunter therewithin, said cover being formed of pliable sheet material whereby when it is removed from said frame, it may be folded into a relatively small package.

4,186,508

LINE GUIDE FOR FISHING ROD

Arthur M. Howald, Perrysburg, Ohio, assignor to Shakespeare Company, Columbia, S.C.

Filed Nov. 14, 1978, Ser. No. 960,701

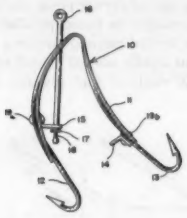
Int. Cl.[2] B32B *9/00;* **A01K** *87/04*

U.S. Cl. 43—24 **12 Claims**

1. A monolithic line guide and mounting foot for a fishing rod comprising a circular laminate of wound resin-impregnated graphite fibers and linear foot laminate of resin-impregnated graphite fibers heat-welded to one side of said circular laminate in substantial parallelism to the axis thereof, some of

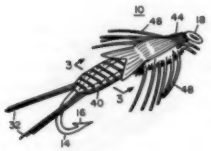
the graphite fibers of said circular laminate underlying said foot and others overlying said foot.

4,186,509
EXPANDABLE FISH LURE
Willard S. Maloney, 4360 SW. 4th St., Miami, Fla. 33134
Filed Apr. 17, 1978, Ser. No. 896,715
Int. Cl.[2] A01K *83/02*
U.S. Cl. 43—36 **9 Claims**



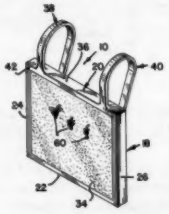
1. An expandable fish lure adapted to be coupled to a fishing line comprising:
a pair of substantially flat sides having a fish lure appearance in order to attract fish;
means coupled to both of said sides for biasing said sides apart;
a pair of fish hooks, each carried by one of said sides at one extremity thereof;
locking means including a rigid shaft coupled to said fishing lure for locking said sides together against the tension of said biasing means, said locking means further including means permitting releasing of said sides responsive to movements of said shaft axially with respect to said fishing line, said locking means including two locking plates positioned between said sides, a first one of said locking plates coupled to a first one of said sides and having a hole therein for receiving said shaft, a second one of said locking plates coupled to the second side and having a hole therein for receiving said shaft, and wherein said holes in said first and second plates are aligned when said shaft is extending through both of said holes; and wherein said shaft includes a shoulder spaced from one extremity thereof, said shoulder having a dimension greater than said hole in said first plate to prevent said one extremity from moving through said hole in said first plate.

4,186,510
FLAT-BODIED NYMPH HOOK
Neil B. Kimerer, Jr., Linden Hall, Pa. 16801
Filed Mar. 8, 1978, Ser. No. 884,555
Int. Cl.[2] A01K *85/08*
U.S. Cl. 43—42.25 **9 Claims**



1. A flat-bodied fishing lure comprising in combination:
a hook eye;
a shank element attached to said hook eye and extending therefrom to form a flat plane, said shank element comprising in combination:
two diverging arms connected to said hook eye,
two parallel arms connected to said two diverging arms,
two converging arms connected to said parallel arms, one end portion of said converging arms in contact with one another,
two parallel contiguous arms connected to said two converging arms,
said two parallel contiguous arms being adjacent to one another;
fly thread circumferentially wrapped about said two parallel contiguous arms, integrally connecting said two parallel contiguous arms;
a curved hook attached to one of said parallel contiguous arms;
a hook point attached to said hook.

4,186,511
FISH LURE HOLDER
Alan W. Slacter, 2840 Webster Ave. South, St. Louis Park, Minn. 55426
Filed Nov. 4, 1977, Ser. No. 848,409
Int. Cl.[2] A01K *97/06*
U.S. Cl. 43—57.5 R **4 Claims**



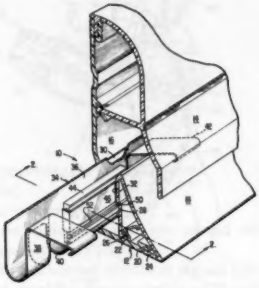
1. A fishing lure box adapted to be secured to the side of a boat for retaining lures having fish hooks in a position readily accessible to the fisherman, the boat having a gunnel about the sides thereof, comprising:
(a) a frame having a substantially planar base member having a top and bottom end and front and rear surfaces and a top wall extending outward from said planar base at said top end;
(b) a lure support member formed of elastomeric material affixed to said front surface of said base member so that said hook of said lures may be inserted within said elastomeric material; and
(c) a resilient clip arm having a first end affixed to said top wall of said base member, said arm extending upward from said top wall such that said frame may be positioned beneath the gunnel and curving away from said top wall and generally toward said rear surface of said frame member with a relatively large radius of curvature to provide adequate clearance between said clip arm and the exterior surface of the gunnel, said clip arm then extending downward and toward said rear surface of the base member, said clip arm having an unstressed state in which the free end of said arm is biased against said rear surface and a stressed state wherein the boat side is disposed between the free end of said arm and rear surface of said base material so that the frame is positively engaged against the inside of the boat wall with said top wall below the gunnel.

4,186,512

ELECTRIFIED INSECT TRAP HAVING SHORT CIRCUITING MEANS

Fred W. Berg, Stamford, Conn., assignor to Shock-M-All, Inc., Valley Stream, N.Y.

Filed Sep. 29, 1977, Ser. No. 837,923
Int. Cl.[2] A01M *1/22*
U.S. Cl. 43—98 **11 Claims**



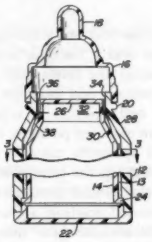
1. An electrified insect trap, comprising:
a first member;
a second member detachably secured to said first member;
means mounted within said first member and engageable with said second member, for establishing an electrical potential when said second member is attached to said first member and for short circuiting said electrical potential when said second member is detached from said first member; and
said means comprising at least two electrical conductors in a spaced apart unobstructed relationship when said second member is attached and secured to said first member thereby permitting an insect to contact both of said conductors simultaneously whereby a lethal shock is imparted to said insect.

4,186,513

TOY NURSING BOTTLE

Seymour Blum, Rockville Center, N.Y., assignor to H-G Toys, Inc., Long Beach, N.Y.

Filed Jun. 26, 1978, Ser. No. 918,871
Int. Cl.[2] A63H *13/02*
U.S. Cl. 46—1 D **7 Claims**



1. A toy nursing bottle comprising inner and outer shells separated by an annular space, a cap on said outer shell, the interior of said cap communicating with the space between the shells by at least one notch on at least one of the shells, a pair of ribs on one of said shells, said ribs being adjacent to and on opposite sides of said notch, one end of each rib being adjacent one end of said notch, the distance between the ribs being at least as great as the distance across the notch.

4,186,514

SLIP-KNOT PINATA

Ramiro Oquita, 6014 Chandler Dr., San Diego, Calif. 92117

Continuation-in-part of Ser. No. 873,804, Jan. 31, 1978, which is a continuation-in-part of Ser. No. 758,215, Jan. 10, 1977, Pat. No. 4,092,718, which is a continuation-in-part of Ser. No. 617,602, Sep. 29, 1975, Pat. No. 4,015,364. This application Jul. 14, 1978, Ser. No. 925,006
Int. Cl.[2] B65D *5/36*; A63H *33/00*
U.S. Cl. 46—11 **9 Claims**

1. A pinata, comprising:
first and second mutually cooperating walls;
means for suspending said pinata and for releasably holding said walls in assembled relation to define a substantially enclosed chamber, whereby a plurality of small items may be carried in said chamber, said suspending and holding means including a first elongated flexible member, said member being disposed in a releasable locking arrangement for holding said walls in said assembled relation and for releasing said walls from said assembled relation whereby a plurality of said items may be released from said chamber; and
a plurality of elongated flexible members associated with said pinata externally of said chamber, means, including one of said plurality of elongated flexible members, for releasing said first flexible member from said locking arrangement in response to the application of a force to a part of said latter means.

4,186,515

TOY HORSE VEHICLE

Iwakichi Ogawa, Kashiwa, Japan, assignor to Takara Co., Ltd., Tokyo, Japan

Filed Dec. 22, 1977, Ser. No. 863,213
Int. Cl.[2] A63H *33/00*
U.S. Cl. 46—22 **16 Claims**

1. A versatile toy assembly capable of being combined into various toy configurations such as a simulated horse or a centaur comprising;
a body member configured to simulate the body of a horse;
support means removably connected to the body member;
a pivotal connection assembly attached to the interior of the body member;
a joint assembly configured and positioned on the body member to represent respectively the withers and breast of a horse with an upper cavity containing a pair of magnetizable members, and

a pair of removable appendage members configured to simulate respectively a horse's neck and head and the upper torso, head and upper arms of a humanoid, each appendage member having complimentarily magnetizable connectors for co-action with the joint assembly magnetizable members, the joint assembly is connected to the pivotal connection assembly to permit movement of an attached appendage member relative to the body member.

4,186,516

POSABLE DOLL

Burt Ensmann, Flushing, N.Y., assignor to Ideal Toy Corporation, Hollis, N.Y.

Filed Mar. 13, 1978, Ser. No. 886,236
Int. Cl.[2] A63H *11/10*
U.S. Cl. 46—107 **8 Claims**

1. A toy doll including a torso, a first leg freely pivotally mounted on said torso for relatively free unrestrained pivotal movement between at least two predetermined positions, a second leg pivotally mounted on said torso in relatively tight frictional engagement therewith permitting movement of the second leg to any of a plurality of positions with respect to the torso, said second leg being maintained in its relative position with respect to said torso by the frictional engagement therebetween; and a support stand for said doll including means for holding said first leg on said support stand in a relatively fixed position whereby movement of said stand will cause said torso and the second leg held thereon to pivot with respect to said first leg to one of said predetermined positions.

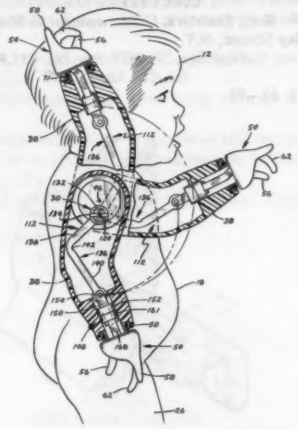
4,186,517

DOLL WITH ARM-ACTUATED FINGERS

James O. Kuhn, New York, N.Y.; James J. Wright, Loveland, and Howard N. Bollinger, Cincinnati, both of Ohio, assignors to CPG Products Corp., Minneapolis, Minn.

Filed Feb. 7, 1978, Ser. No. 875,729
Int. Cl.[2] A63H *3/46*
U.S. Cl. 46—119 **21 Claims**

1. A doll comprising a torso, a first arm connected at one end to said torso for pivotal movement about a first shoulder axis, a first hand mounted at the other end of said arm including at least one flexible finger, and first actuating means responsive to pivotal movement of said arm for flexing said finger as said arm is swung about said shoulder axis, a second arm connected at one end to said torso for pivotal movement about a second shoulder axis, a second hand mounted at the other end of said second arm including at least one flexible finger, and second actuating means responsive to pivotal movement of said second arm for flexing said finger on said second hand independently of the finger on said first hand as said second arm is swung about said shoulder axis.



4,186,518

KICKING DOLL WITH DETACHABLE TRIGGER MEANS

Patrick Luke, Kowloon, Hong Kong, assignor to Mego Corporation, New York, N.Y.

Filed Oct. 25, 1977, Ser. No. 844,643
Int. Cl.[2] A63H *13/04*
U.S. Cl. 46—128 **8 Claims**

1. A doll with an intermittently movable leg, comprising a torso having a front and a back, a hollow interior, and an opening communicating the latter with the exterior of said torso; means for mounting said movable leg on said torso for pivoting between a rest position in which said leg depends from said torso and an elevated position, in a trajectory extending frontwardly and upwardly relative to said torso; a main gear connected to said leg for joint pivoting; a toothed rack mounted in said interior of said torso for movement between a retracted and an extended position; a gear transmission including at least one intermediate gear interposed between and meshing with said rack and said main gear for converting the movement of said rack into the pivoting of said main gear; and means for moving said rack between said positions thereof, including trigger means separate from and detachably connected to said torso and having a housing and a shaft supported in said housing and extending beyond the same and, when said trigger means is connected to said torso, into said interior of the latter through said opening to contact and move said rack upon actuation of said trigger means.

4,186,519

CB VEHICLE TOY

David F. Repka, Rte. 2, Box 321, Midlothian, Tex. 76065

Filed Aug. 19, 1977, Ser. No. 826,165
Int. Cl.[2] A63H *17/32*
U.S. Cl. 46—202 8 Claims

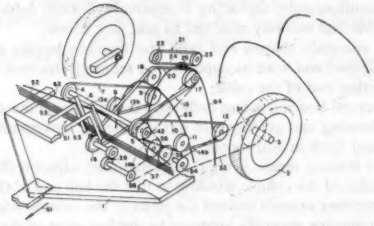
1. A toy comprising, in combination:
a toy vehicle;
an electrical power source;
a microphone, switchable between on and off, for converting sounds into electrical signals;
a speaker for converting electrical signals into sound; and
an electrical amplifier for simulating a CB radio, switchable between on and off, comprising a means for transmitting electrical signals from the microphone to the speaker when the circuit is on and the microphone is on.

4,186,520

LOW LEVEL CULTIVATION TUNNELS

Yekutiel Alper, and Amikam Margolin, both of Rishon le'Zion, Israel, assignors to The State of Israel, Ministry of Agriculture, Jerusalem, Israel

Filed May 30, 1978, Ser. No. 910,919
Int. Cl.[2] A01G *13/02*
U.S. Cl. 47—1 R 12 Claims



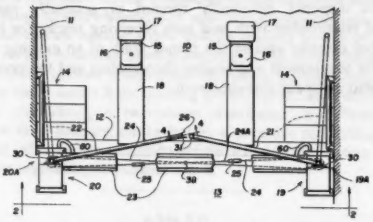
1. Apparatus for forming and mounting in position wire arch supports for low level cultivation tunnels comprising in combination:
a. a support chassis adapted to be coupled to drive means for displacing said apparatus in a given direction and rate,
b. arch forming means carried by said chassis for forming arch supports from arch wire blanks, and
c. arch displacing means carried by said chassis for imparting to each arch a displacement having a first component at said given rate and being directed opposite to said given direction and substantially normally to the plane of the arch and a second component directed downwardly and in the plane of the arch.

4,186,521

SAFETY GATE FOR VEHICLE WHEEL ALIGNMENT PIT INSTALLATIONS

Lee Hunter, 13501 Ladue Rd., Ladue, Mo. 63141

Filed Jun. 2, 1978, Ser. No. 911,762
Int. Cl.[2] E05F *15/20, 17/00*
U.S. Cl. 49—30 6 Claims



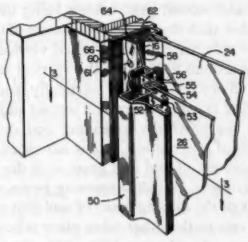
1. Safety gate means at the floor level for blocking access of a vehicle or person to the edge of a vehicle service floor pit, said gate means comprising: biparting gate sections; a pair of towers positioned spaced apart from each other but adjacent the edge of the floor pit, a gate section being pivotally supported by each tower for movement between aligned positions blocking access to the edge of the floor pit and separated positions projecting away from each edge in a direction to the suspended over the floor pit for exposing the edge of the floor pit between said towers; gate sections supporting posts pivotally mounted in each tower; drive means connected to each post; reversible power operated means in one of said towers operably connected to the gate supporting post therein; driven means extending between said towers and interconnecting said drive means for said posts, said driven means being adjacent the floor level and traversing the space between said towers for effecting simultaneous movement of said gate sections between said aligned and separated positions; and control means in said one of said towers connected to said power operated means, said control means including means for determining the direction of movement of said gate sections by operation of said reversible power operated means, gate section position limit switches in one of said towers responsive to the position of the adjacent gate section to determine the full aligned and separated positions of both of said gate sections, and manual switch means to initiate the operation of said control means.

4,186,522

STORM WINDOW FRAME

Jimmy W. Hooks, Carrollton, Tex., assignor to Home Craftsman Company, Inc., Irving, Tex.

Filed Jul. 31, 1978, Ser. No. 929,708
Int. Cl.[2] E05C *7/02*
U.S. Cl. 49—63 10 Claims



1. An improved storm window structure for assembling outwardly of existing window jambs, said storm window being

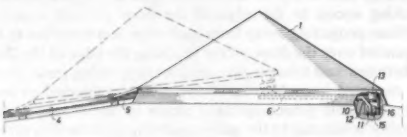
of the type having a plurality of sash receiving tracts integrally formed within a window frame channel and secured to an existing window frame jamb for creating a sealed dead air space therebetween, said improvement comprising a window frame channel having a plurality of sash receiving tracks staggered in a tapering configuration in axial alignment with an inwardly extending flange portion comprising a leg element which leg element includes a substantially coplanar flange portion disposed outwardly thereof in generally parallel spaced relationship with said sash receiving tracks for being received directly against the planar jamb of an existing window for securement and sealing thereagainst and the creation of a dead air space therebetween.

4,186,523

SKYLIGHT OPERATING MEANS

Tore G. Palmaer, S-330 30 Gnosjo, Sweden

Filed Jun. 19, 1978, Ser. No. 916,549
Claims priority, application Sweden, Jan. 9, 1977, 7709837
Int. Cl.[2] E05D *15/10*
U.S. Cl. 49—209 **5 Claims**



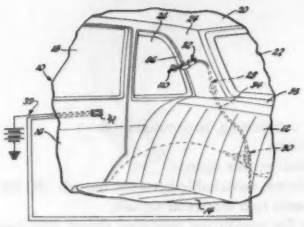
1. A drive system for a movable closure member movable along rail sets carried on opposed sides of the frame of a structure, said drive system, comprising a rail set on each side of at least one pair of opposed sides of the said frame, each said rail set including first and second laterally offset toothed sections, each said first section having a horizontally extending segment and a downwardly extending segment, each said second section having a vertically extending segment and an upwardly extending segment, a portion of said downwardly and upwardly extending segments being juxtaposed in side-by-side relation; an electric motor carried by said closure member for movement therewith and having a drive shaft extending transversely of said rail sets; a first gear wheel mounted at each end of said drive shaft coaxial therewith and cooperable with the respective first sections of said rail sets; a second and smaller gear wheel mounted eccentrically on each said first gear within the periphery thereof and cooperable with the respective second sections of said rail sets, each said second gear being arranged on its associated first gear such that they have a substantially common point of tangency; and the respective rail sets and first and second gear wheels being dimensioned relative to each other such that during activation of the electric motor and closure member is initially raised vertically during engagement of the second gears with the vertical segments of said rail sets, is advanced partially vertically and partially longitudinally during engagement of said second and first gears respectively with the upwardly extending and downwardly extending segments of said rail sets, and is advanced longitudinally during engagement of said first gears with the horizontal segments of said rail sets; said dimensioning being selected to insure that transfer of the driving force of said first and second gear wheels from one to the other takes place when the point of common tangency of said gears falls within the portions of said upwardly and downwardly extending segments juxtaposed in side-by-side relation.

4,186,524

POWER ACTUATOR FOR PIVOTABLE WINDOW

Paul F. Pelchat, Canton, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 14, 1978, Ser. No. 896,309
Int. Cl.[2] E05F *11/00*
U.S. Cl. 49—324 **3 Claims**



1. A remotely controlled and powered actuator to move a free edge portion of a vehicle window between open and closed positions about an opposite hinge-mounted edge portion comprising:

reversible electric motor means and circuit means associated therewith, including switch means for selectively activating the motor alternately in either direction from a switch location remote from the motor;

gear means including a small gear driven by said electric motor and a larger gear meshed therewith, having an internally threaded hub portion and permitted to rotate but not move axially with respect to the threaded hub portion;

an elongated jack screw threadably extending through the hub portion and movable axially therefrom by means of the rotation of threaded hub portion of the larger gear;

a sheathed motion and linear force transmitter of elongated configuration, including a relatively flexible cable with one end securely attached to said jack screw;

an arcuately shaped and rigid rod member having a ball-shaped end with its opposite end securely attached to the other end of the cable;

a curved housing means defining a curved tunnel therein for housing and guiding said rod member in movement back and forth in said tunnel;

said housing means being fixedly mounted adjacent the free edge of the vehicle window so that the ball end of the rod member extends toward the plane of the vehicle window;

a connector assembly mounted to the free edge of the vehicle window and including a flat surface on which said ball end may slide and rotate thereagainst as the window moves between opening and closing positions;

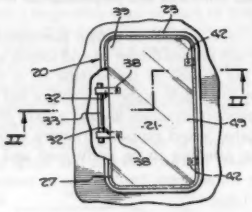
said connector assembly further including means to positively secure the ball end including a ferrule encircling said arcuate rod by an opening smaller than the ball end diameter and a cap member extending over the ferrule to hold it and said ball end against said flat surface, said cap member having an opening through which said rod extends sufficient to permit adequate lateral sliding movement in any direction of the ball end and ferrule caused by changes in the angular relationship between the plane of the window and the axis of the arcuate rod but insufficient to permit movement of said ferrule therethrough.

4,186,525

REMOVABLE CLOSURE PANEL AND RELEASABLE SPRING HINGE MEANS THEREFOR

Elmer R. Carvalho, Claremont, Calif., assignor to D G Shelter Products Company, City of Industry, Calif.

Filed Apr. 24, 1978, Ser. No. 899,111
Int. Cl.[2] E05C *21/02*
U.S. Cl. 49—465 **9 Claims**



1. A hinge construction for a panel serving as a removable closure for an opening defined by a frame having support surfaces for edge margins of said panel and resilient compressible gasket means between said edge margins and said support surfaces, comprising in combination:

means providing a recess on said frame defined by a downwardly directed lip beneath said support surfaces;

a securement means extending through the panel edge margins in lateral spaced relation to said recess means;

leaf spring means carried by said securement means and having a spring edge portion receivable in said recess for hinging relation therewith in one position;

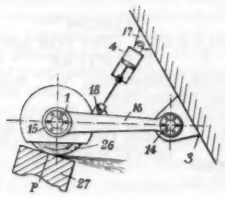
and means adjustable on said securement means and adapted to contact said spring means for moving said spring means into said hinged relation with said recess means in said one position and for releasing said spring means in another position.

4,186,526

HIGH-SENSITIVITY CONTROL-SYSTEM FOR IRONWORK GRINDERS

Michel Harmant, Neris-les-Bains, France, assignor to Etablissements Zelant, Gazuit, Societe Anonyme, Montlucon, France

Filed Dec. 30, 1977, Ser. No. 865,872
Claims priority, application France, Jan. 7, 1977, 77 00344
Int. Cl.[2] B24B *49/08*
U.S. Cl. 51—33 R **2 Claims**



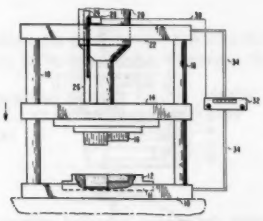
1. A device for controlling the grinding pressure of a grinding wheel for grinding a surface of a product, comprising: a support, an arm pivotally suspended from said support substantially free of play, a grinding wheel rotatably supported at the free end of said arm, a mechanism for transmitting rotational movement to said wheel, a cylinder-piston unit having a cylinder, a piston in said cylinder and two chambers on opposite sides of said piston, said cylinder-piston unit being pivotally connected to said arm at a point along the length of the arm and also being pivotally connected to said support at a point forming with said point on said arm and the pivotal connection of said arm to said support a triangle, and means for controlling the bearing pressure of the grinding wheel on the surface, said means including means for establishing a differential pressure between said two chambers, a feed pump for said cylinder-piston unit, a hydraulic circuit connected to said pump for supplying pressure to said chambers of said cylinder-piston unit, said hydraulic circuit having a first branch leading to one of said chambers and a second branch leading to the other chamber, one of said branches comprising regulating valves, a pressure limiting valve and a flow limiting choke valve, and the other branch comprising a two-piston distributor, a differential valve, a flow limiting choke valve, a pressure regulating sequential valve and an electrohydraulic valve for operating said pressure regulating sequential valve.

4,186,527

APPARATUS FOR SHAPING ELECTRODES

Marten C. Hausermann, Addison, and Elmer P. Hausermann, Bensenville, both of Ill., assignors to Hausermann Abrading Process Company, Addison, Ill.

Filed Aug. 7, 1978, Ser. No. 931,609
Int. Cl.[2] B24B *19/00*
U.S. Cl. 51—58 **4 Claims**



1. An improved apparatus for forming electrical discharge machining electrodes said apparatus being of the type including a first platen, a second platen mounted in superimposed relation and adapted to be driven vertically with respect to said first platen, a die member having an abrasive surface mounted on one of said platens, a workpiece member mounted on the platen opposite the platen on which said die member is mounted in working alignment with said die member, means for applying horizontal oscillatory rotary motion to said first platen, vertical drive means for infeeding said workpiece member and said die member into contact with each other while said oscillatory rotary motion is being applied to thereby abrasively shape said workpiece member to the form of said die member, and wherein said improvement comprises

means for sensing the relative vertical position of said die member with respect to said workpiece member and generating an output signal representing said relative vertical position;

means for providing a first predetermined reference signal representing a first relative vertical position and corresponding to a preselected maximum vertical distance between said die member and said workpiece member;

means for providing a second predetermined reference signal representing a second relative vertical position and corresponding to a vertical distance between said die member and said workpiece member of substantially zero;

means for providing a third predetermined reference signal representing a third relative vertical position and corresponding to a preselected penetration of said workpiece member by said die member;

means coupled to said sensing means, and to said first, second and third reference signal means for comparing the output signal of said sensing means with said first, second

and third reference signals and for generating first, second and third output signals when the output of said sensing means is equal to said first, second and third reference signals respectively;

said vertical drive means being adapted for infeed and outfeed operation at at least two drive rates; and

means coupled to said comparing means for cyclically controlling the operation of said vertical drive means to infeed said die member and said workpiece member at a first relatively higher rate until the output signal of said sensing means is equal to said second reference signal, at a second relatively slower rate until the output signal of said sensing means is equal to said third reference signal, and to outfeed said die member and said workpiece at said first relatively higher rate until the output signal of said sensing means is equal to said first reference signal.

4,186,528

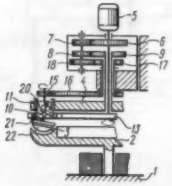
MACHINE FOR TREATING SPHERICAL SURFACES OF PARTS WITH MAGNETO-ABRASIVE POWDER

Petr I. Yascheritsyn, Leninsky prospekt 18, kv. 102; Faddei J. Sakulevich, pereulok Dalny 3; Leonty A. Olender, ulitsa Ya. Kolasa, 67, kv. 14, and Alexandr A. Kosobutsky, ulitsa R. Ljuxemburg, 161, kv. 5, all of Minsk, U.S.S.R.

Filed May 23, 1978, Ser. No. 908,672

Int. Cl.[2] B24B *5/00*

U.S. Cl. 51—161 **2 Claims**



1. A machine for treating spherical surfaces of parts with magnetoabrasive powder in a magnetic field comprising: a circular horizontal channel whose generatrix has the form of a portion of a circumference, said channel serving as a magnet; a rotor arranged above said circular channel; a drive for said rotor; spindles secured around the circumference of said rotor above said circular channel; means for imparting to each of said spindles a rotary and, simultaneously, precessional motion, the precession center lying mostly on the line of centers of the generatrix of the circular channel; a magnet secured on the lower end of each spindle and adapted for fastening a part to be treated to said spindle; and a magnetoabrasive powder contained in said circular channel.

4,186,529

PROGRAMMABLY CONTROLLED METHOD FOR GRINDING END CUTTING TOOLS AND THE LIKE

Stanley E. Huffman, Clover, S.C., assignor to S. E. Huffman Corporation, Clover, S.C.

Division of Ser. No. 810,776, Jun. 28, 1977, Pat. No. 4,115,956. This application Apr. 17, 1978, Ser. No. 896,987

Int. Cl.[2] B24B *1/00*

U.S. Cl. 51—288 **7 Claims**

1. The method of machine grinding a workpiece such as a cutting tool with a grinding wheel comprising the steps:

(a) installing the workpiece in the workpiece holder of the machine and positioning the central axis of the workpiece with respect to fixed reference X, Y, Z axes appropriate to the first grinding operation to be performed thereon and fixing the workpiece in such position;

(b) incrementally and independently and by N/C, positioning the workpiece during grinding thereof relative to the following axis:

(i) rotatively, with respect to an axis extending through the workpiece as a first axis;

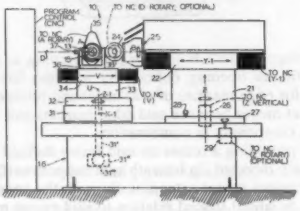
(ii) linearly, with respect to a second horizontal linear axis at all times disposed below said workpiece axis and fixed perpendicular thereto;

(iii) linearly, with respect to a third horizontal linear axis at all times disposed below said second axis and fixed relative thereto;

(iv) rotatably, with respect to a fourth vertical axis intersecting said third axis and perpendicular to said second axis; and

(v) linearly, with respect to a fifth horizontal axis intersected by and perpendicular to said fourth vertical axis;

(c) installing the wheel on the spindle of a motor drive supported by the wheel support structure and positioning said wheel support structure around a sixth fixed vertical axis to a rotated wheel support structure position appropriate to the grinding to be performed and fixing said



wheel support structure in such position with respect to rotation about said sixth axis; and

(d) incrementally and independently and by N/C positioning the wheel during grinding of said workpiece relative to the following axes passing through said wheel support structure:

(i) linearly, in a vertical direction with respect to said sixth vertical axis;

(ii) linearly, in a horizontal traverse, with respect to a seventh horizontal axis intersecting and perpendicular to said sixth axis; and

(iii) rotatively, in a vertical sweep, with respect to an eighth horizontal axis parallel to said seventh axis; and

(e) synchronizing said N/C workpiece and wheel positioning by N/C programs whereby said N/C positioning with respect to any number of said axes may take place simultaneously as and when required during the grinding of said workpiece.

4,186,530

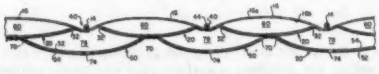
TRIPLE WALL PANEL UNIT FOR AIR SUPPORTED STRUCTURE

Donato M. Fraioli, Mamaroneck, N.Y., assignor to Air Tech Industries Inc., Clifton, N.Y.

Continuation-in-part of Ser. No. 696,635, Jun. 16, 1976, Pat. No. 4,065,889. This application Dec. 19, 1977, Ser. No. 861,845

Int. Cl.[2] E04B *1/34*

U.S. Cl. 52—2 **7 Claims**



1. A collapsible unit for an air supported structure comprising:

an outer wall,

a pair of elongated first panel members attached along their edges adjacent one another to one surface of said outer

wall to define a first space between each of said first panel members and said outer wall,

a second elongated panel member attached to the respective surfaces of said pair of first panel members facing outwardly from said one surface of said outer wall and spanning the two adjacent edges of said pair of first panel members to define a second space between said first and said panel members,

first means on each of said members of said pair of first panel members along a substantial portion of the length thereof adjacent a respective edge of each of said panel members of said pair of first panel members for venting as the panel unit is collapsed at least a part of the air contained in each of said first spaces to said second space, and

second means on said second panel member along a substantial portion of the length thereof which lie along a path generally confronting said first means for venting as the panel unit is collapsed the air originally contained in said second space and the air which is transferred from said first spaces to said second space as the panel unit is collapsed.

4,186,531

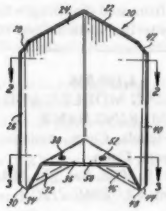
FASCIA-PROTECTING DRIP-DIVERTING DEVICE

Anton Okolischan, 9475 Trillium Dr., Crestwood, Mo. 63126

Filed May 30, 1978, Ser. No. 910,369

Int. Cl.[2] F04D *13/00*

U.S. Cl. 52—11 **16 Claims**



1. A fascia-protecting, drip-diverting device which has an upper portion, a lower portion, and a stop, said upper portion being thin so it is adapted to be telescoped upwardly into the narrow space between a fascia and a gutter which is disposed immediately adjacent said fascia, said lower portion being thicker, stiffer and stronger than said upper portion so it is adapted to withstand the forces which must be applied to said fas·ia-protecting drip-diverting device to cause said upper portion to telescope upwardly into said narrow space between said fascia and said gutter, said stop being adapted to limit the extent to which said upper portion is telescoped upwardly into said narrow space between said fascia and said gutter, said fascia-protecting drip-diverting device being dimensioned so the bottom of said lower portion is disposed below the level of the bottom of said fascia when said stop limits the extent to which said upper portion is telescoped upwardly into said narrow space between said fascia and said gutter, whereby said bottom of said lower portion is adapted to cause drips to move downwardly below the level of, and then fall away from, said bottom of said fascia without engaging said fascia.

4,186,532

UNDERWATER OBSERVATORY

Morris S. Kahn, P.O. Box 8388, St. Thomas, V.I.

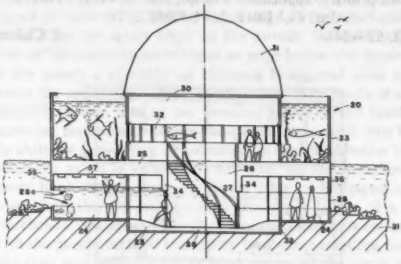
Filed Dec. 6, 1977, Ser. No. 858,059

Claims priority, application Israel, Dec. 7, 1976, 51059; Dec. 8, 1976, 51069

Int. Cl.[2] B63B *35/00*

U.S. Cl. 52—169.1 **9 Claims**

1. An off-shore underwater observatory comprising a lower, submerged observation gallery fitted with at least one observation window and having a ceiling with an opening through which the observation gallery is accessible, and a body of water acting as ballast on top of the gallery such that the combined weight of the structure and the water exceeds the



buoyancy and holds the observatory in position without any anchorage, said body of water being arranged as an aquarium and an upper observation gallery being provided adjacent thereto.

4,186,533

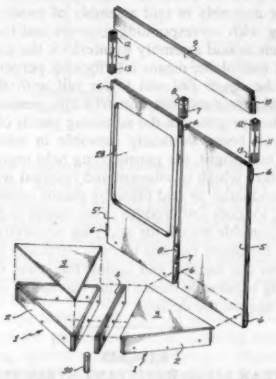
MODULAR BUILDING STRUCTURE

David C. Jensen, 81 W. Cordova St., Vancouver, B.C., Canada (V6B 1C8)

Filed May 16, 1977, Ser. No. 796,974

Int. Cl.[2] E04F *11/00*; E04B *1/00*

U.S. Cl. 52—184 **2 Claims**



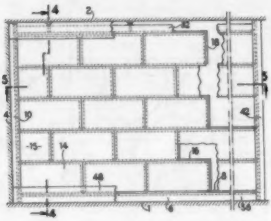
1. A modular floor system comprising a plurality of floor components each of which includes a base of equilateral triangle shape and a sheet material top of substantially the same shape supported by said base with the edges of said top substantially coplanar with the sides of said base, spacers secured to said floor components for maintaining each of said components with at least one of its sides spaced from, parallel to and in alignment with a side of another of said components, each of said spacers being of a height at least as great as the combined heights of an adjacent floor component base and the top supported thereby for preventing shifting of such top relative to such base, said spacers and said floor components forming a plurality of gaps of hexagon cross section at the apexes of floor components, and a plurality of plugs of hexagon cross section substantially filling said gaps.

4,186,534

PARTITION WALL CAPABLE OF BEING DISMANTLED

Rene-Jean M Le Coze, 10 Rue du Dr. Lettry, 56100 Lorient, France

Filed Apr. 5, 1978, Ser. No. 893,689
Claims priority, application France, Apr. 5, 1977, 7710274
Int. Cl.[2] E04B 2/74; E04C 1/10
U.S. Cl. 52—241 **8 Claims**



1. A partition wall structure capable of being dismantled for a room having a floor, ceiling and lateral walls, the partition wall structure comprising in combination an outer framework comprising a horizontal lower rail for placing on the floor, a horizontal upper rail for location adjacent the ceiling and a vertical upright for placing against one of said walls; an assembly in a vertical plane of adjoining generally rectangular panels located within the framework and adjoining the upper rail and the lower rail and adjoining the upright, there being a plurality of the panels in vertically adjoining relation to each other between the upper rail and lower rail and plurality of panels in adjacently adjoining relation to each other, the panels forming therebetween vertical joints which are in laterally staggered relation to each other from one joint to the next higher or lower joint, each panel defining four edges, means defining tongues and grooves which are unitary with the edges of the panel before assembly in said assembly of panels and respectively fitting with corresponding grooves and tongues of adjoining panels in said assembly to interlock the panels perpendicularly of said plane; means interlocking perpendicularly of said plane the upper rail and lower rail with the adjoining panels of said panels and means interlocking perpendicularly of said plane the upright with the adjoining panels of said panels, the upper rail being vertically movable in said framework relative to the upright; the panels being held together to form a wall structure which is coherent and resistant with regard to forces perpendicular to said plane by means consisting of said interlocking tongues and grooves of the panels and of pressure-applying expansible means for applying vertically downward pressure on the upper rail and thereby vertically clamping the panels against one another and against the lower rail, the pressure-applying expansible means being carried by the upper rail for bearing against the ceiling.

4,186,535

SHEAR LOAD RESISTANT STRUCTURE

Virgil R. Morton, Redondo Beach, Calif., assignor to Verco Manufacturing, Inc., Phoenix, Ariz.

Continuation-in-part of Ser. No. 805,523, Jun. 10, 1977, abandoned. This application Aug. 23, 1978, Ser. No. 936,176
Int. Cl.[2] E04C 2/32
U.S. Cl. 52—250 **13 Claims**

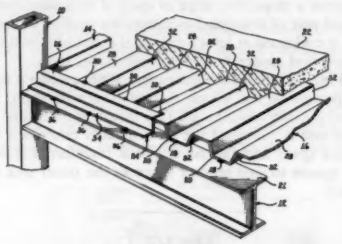
1. A diaphragm for translating horizontal shear loads imposed thereon through a supporting load bearing member to vertical load resisting members in buildings, said diaphragm comprising in combination:

a. a fluted deck, said fluted deck including webs alternately interconnecting top and bottom flutes terminating at opposed open ends defined by the extremities of said webs, said top flutes and said bottom flutes, said fluted deck having the opposed open ends supported by a load bearing member;

b. first welds for rigidly securing the ends of each of said bottom flutes of said fluted deck to the supporting load bearing member;

c. load translation means transversely located with respect to the flutes of said fluted deck for structurally interconnecting the top flutes of said deck with one another and with the load bearing member;

d. second welds for rigidly securing the ends of each of said top flutes of said deck directly to said load translation means; and



e. third welds for rigidly securing the load bearing member directly to said load translation means;

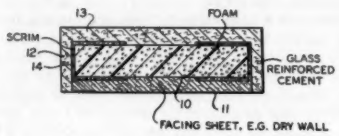
whereby, said load translation means inhibits relative movement between and buckling of said top and bottom flutes of said fluted deck due to horizontal shear loads imposed upon said diaphragm and said load translation means translates the horizontal shear loads from said diaphragm to the load bearing member and ultimately to the vertical load resisting members.

4,186,536

COMPOSITE BUILDING MODULE AND METHOD FOR MAKING SAME

Matthew R. Piazza, Nichols, Conn., assignor to Maso-Therm Corporation, Bridgeport, Conn.

Filed Mar. 9, 1978, Ser. No. 884,921
Int. Cl.[2] E04C 2/20
U.S. Cl. 52—309.12 **14 Claims**



1. Process for making a composite panel-like building module having a rigid foam core encapsulated in a shell of reinforced cementitious material having a facing member on one main face thereof, comprising:

a. providing a first mold having a bottom and side walls;

b. disposing a facing member face down in the bottom of the mold;

c. placing scrim reinforcing material on top of the facing member with excess scrim extending outwardly from the periphery of the facing member;

d. foaming a foam core in situ on the facing member and scrim to a selected height;

e. providing a second mold having a bottom and side walls wherein the area of the bottom wall of the second mold is greater than that of the first mold and the height of the side walls of the second mold is greater than said selected height;

f. depositing a layer of wet cementitious material and fibers in the bottom of the second mold.

g. folding the excess scrim around the foam core produced in step (d) and placing the core and facing member in the

second mold on the bottom layer with the facing member face up and with the periphery thereof spaced from the side walls of the second mold;

h. depositing wet cementitious material and fibers in the free space around the core and facing member to be substantially flush with the face of the facing member; and

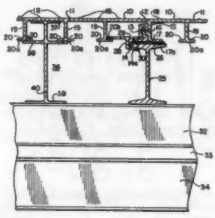
i. curing the wet cementitious shell and removing the thus formed module from the second mold.

4,186,537

TRANSVERSE INTERLOCK FLOORS FOR TRUCKS AND THE LIKE

Elton E. Mountz, Morgantown, Pa., assignor to Morgan Trailer Mfg., Morgantown, Pa.

Filed Aug. 23, 1978, Ser. No. 936,034
Int. Cl.[2] E04B *5/10, 5/14;* B62D *27/06*
U.S. Cl. 52—483 **12 Claims**



1. A floor construction for the body of a vehicle comprising

(A) a plurality of floor planks transversely disposed in edge to edge relation,

each of said planks comprising a top plate with downwardly extending side walls,

the side walls of each plank having interengaging portions for preventing horizontal movement of contiguous planks,

said top plate having between said side walls reinforcing ribs extending downwardly therefrom,

said side walls and said ribs having horizontal flanges;

(B) transverse supporting beams in supporting relation to said floor planks beneath the horizontal side wall flanges of contiguous planks; and

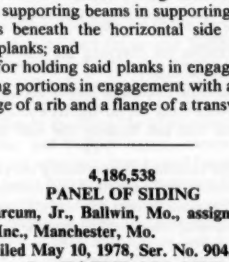
(C) members for holding said planks in engagement with said beams having portions in engagement with a flange of a side edge, a flange of a rib and a flange of a transverse supporting beam.

4,186,538

PANEL OF SIDING

Maxie G. Marcum, Jr., Ballwin, Mo., assignor to Aluminum Industries, Inc., Manchester, Mo.

Filed May 10, 1978, Ser. No. 904,555
Int. Cl.[2] E04D *1/34, 3/361*
U.S. Cl. 52—521 **4 Claims**



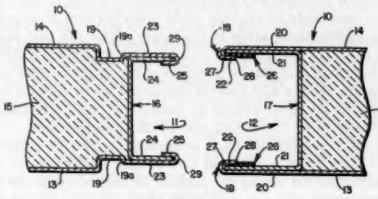
1. An elongate panel of siding adapted to be mounted generally horizontally on the wall of a building, said panel being of thin sheet metal or the like and having two opposing faces, one constituting an inside face which faces said wall and the other constituting an outside face which faces away from the wall, said panel further having upper and lower longitudinal edges, upper hook means comprising a plurality of separate hooks spaced at intervals along the upper edge of the panel and bent down from the upper edge on the outside face of the panel, each of the hooks terminating at an edge below the upper edge of the panel, a plurality of elongate horizontal slots spaced below the upper edge of the panel between the hooks at a level generally above that of the terminal edges of the hooks for receiving fasteners to secure the panel to the wall, slits below the slots for preventing deformation of the panel below the slit when the panel is secured to the wall via the fasteners, and lower hook means along the lower edge of the panel on the inside face thereof for engaging the upper hooks of a panel therebelow on the wall thereby to mount the panels on the wall with the panels secured thereto by fasteners extending through said slots and with the lower hook means of the upper one of the panels interengaged with the upper hooks of the lower one of the panels.

4,186,539

INTERLOCKING MODULAR BUILDING PANEL WITH SEALING STRIP

William M. Harmon, Worthington; Lindell R. Holtzmeier, Athens, and Toshiaki Yamamoto, Columbus, all of Ohio, assignors to United McGill Corporation, Columbus, Ohio

Filed Feb. 9, 1978, Ser. No. 876,499
Int. Cl.[2] E04C *1/14*
U.S. Cl. 52—580 **6 Claims**



1. A modular building panel comprising a structurally rigid, elongated panel having opposed, longitudinally extending, marginal edge portions of mating tongue and socket configuration which are each adapted to interfit edgewise with a mating marginal edge portion of an adjacent panel, said opposed marginal edge portions having respective bead and groove conformations extending longitudinally thereof and configured to interlockingly interfit, said groove formed in the tongue-forming marginal edge portion and opening outwardly with respect to a surface of the panel, said socket-forming marginal edge portion having spaced sidewalls defining a channel therebetween for receiving a tongue marginal edge portion, one of said sidewalls having a terminal edge strip formed along an outer longitudinally extending edge thereof and folded inwardly of the channel in superposed relationship to a surface of the sidewall and forming said bead for interlocking with a groove, and an elongated, flat sealing strip formed from an elastomeric material carried by and disposed in longitudinally extending relationship to said one sidewall at the inwardly facing surface thereof, said sealing strip being of a predetermined width having a longitudinally extending marginal edge portion disposed in underlying relationship to said sidewall terminal edge strip and forming a cooperative fluid-sealing interengagement with the tongue-forming marginal edge portion of another panel when assembled therewith and having the respective bead and grooves thereof disposed in interlocked engagement, said sealing strip extending substantially the length of the panel.

4,186,540

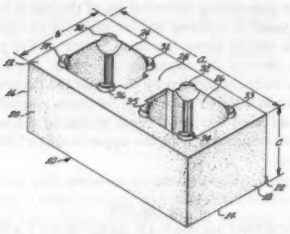
INTERLOCKING CEMENTITIOUS BUILDING BLOCKS

Wayne L. Mullins, 5001 E. Cactus, Scottsdale, Ariz. 85254

Continuation-in-part of Ser. No. 799,725, May 23, 1977, Pat. No. 4,107,894, which is a continuation-in-part of Ser. No. 736,724, Oct. 29, 1976, abandoned, which is a continuation-in-part of Ser. No. 582,378, Apr. 30, 1975, abandoned. This application May 8, 1978, Ser. No. 903,731 The portion of the term of this patent subsequent to Aug. 22, 1995, has been disclaimed.

Int. Cl.[2] **E04C** *1/10*

U.S. Cl. 52—593 **23 Claims**



1. An interlocking building block comprising:

(a) a cementitious body of rectangular configuration having an upper horizontal surface and a lower horizontal surface;

(b) a spaced pair of passages formed through said body so as to extend between the upper and lower surfaces thereof, said passages formed with square in horizontal cross sectional configurations and opening onto the lower surface of said body to provide eight open corners arranged in a predetermined array in the lower surface of said body;

(c) eight corner spanning shelves each located in a different corner of said pair of passages at the upper surface of said body, each of said shelves supported on an integral corner corbel so as to extend in cantilever fashion toward the center of its respective one of said passages; and

(d) eight projections each integrally formed to extend upwardly from a different one of said shelves so as to be arranged on the upper surface of said body in the same geometric array as said open corners are arranged in the lower surface of said body.

4,186,541

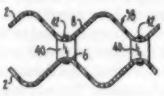
HIGH STRENGTH CORRUGATED METAL PLATE AND METHOD OF FABRICATING SAME

Eugene W. Sivachenko, 6851 Waverly, Redding, Calif. 96001

Division of Ser. No. 699,289, Jun. 24, 1976, Pat. No. 4,099,359. This application May 8, 1978, Ser. No. 904,044

Int. Cl.[2] **E04B** *2/28;* **E04C** *2/32*

U.S. Cl. 52—630 **8 Claims**



1. A high strength corrugated plate assembly comprising in combination first and second corrugated metal plates, each plate having a plurality of generally sinusoidally shaped, alternating peaks and troughs, troughs of the first plate being in alignment with peaks of the second plate, a plurality of spaced apart tubular spacers disposed between the first and second plates having ends in contact with the first and second plates so as to maintain proximate peaks and troughs of the plates aligned and spaced apart, the ends of the tubular spacers having a contoured configuration shaped to conform to the respective contours of the peaks and the troughs of the plates engaged thereby so as to provide a snug engagement between the spacer ends and the plates, and securing means for each spacer extending into the interior thereof for firmly securing the plates to the spacers and thereby to each other by biasing the plates against the spacer ends.

4,186,542

APPARATUS FOR VACUUM-SEALING A VIAL

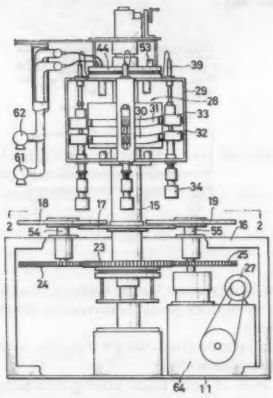
Kenzi Oyagi, Kyoto, Japan, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jun. 15, 1978, Ser. No. 915,774

Claims priority, application Japan, Jun. 17, 1977, 52/72685

Int. Cl.[2] **B65B** *31/02*

U.S. Cl. 53—88 **9 Claims**



1. An apparatus for vacuum-sealing a vial comprising:

a base having a shaft fixed therein;

a table on said base supporting a vial temporarily closed by a rubber stopper;

a first rotary means for carrying the vial along said table around a vertical axis;

a vertically movable enclosing means above said table and movable downwardly for air-tightly enclosing therein the mouth of the vial and holding the vial securely on the table;

a rubber stopper suction head vertically movable within the enclosing means for engaging the rubber stopper and applying a vacuum thereto for withdrawing it from the vial; said enclosing means and suction head being movable around said vertical axis;

a cylindrical cam fixed to said shaft;

a first cam follower movable around said shaft and engaging with the cylindrical cam and connected to said enclosing means for moving the enclosing means vertically;

a second cam follower movable around said shaft and engaging with the cylindrical cam and connected with said suction head for moving said suction head vertically within the enclosing means in timed relation to the vertical movement of the enclosing means;

a first evacuating means adapted to communicate with the enclosing means;

a second evacuating means communicating with the rubber stopper suction head for applying vacuum to the stopper in timed relation to the evacuation of the enclosing means; and

a valve device for communicating the enclosing means with the first evacuating means and for communicating the rubber stopper suction head with the second evacuating

means independently of each other in timed relation to the lowering of the rubber stopper suction head and of the enclosing means;

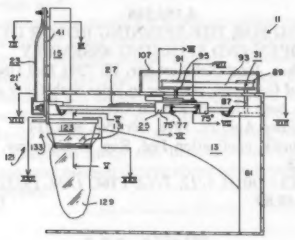
whereby, while the vial is carried by the first rotary means, the enclosing means air-tightly encloses therein the mouth of the vial, and when the rubber stopper suction head is lowered the rubber stopper is drawn against it, and then said suction head elevates to remove the rubber stopper from the mouth of the vial, and the enclosing means is evacuated in timed relation to the evacuation of the rubber stopper suction head, thereby permitting the evacuation of the vial within the enclosing means for a predetermined time, and the rubber stopper suction head is then lowered to close the vial with the rubber stopper.

4,186,543

FOOD PROCESSOR

Charlie D. Lyell, Martin, Tenn., assignor to Sharon N. Lyell, Martin, Tenn., a part interest

Filed May 11, 1978, Ser. No. 904,801
Int. Cl.[2] B02C *1/02, 18/02;* B65B *63/00*
U.S. Cl. 53—515 **11 Claims**



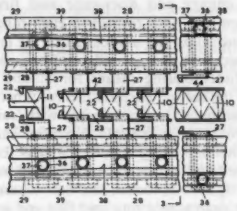
1. A food processor comprising a frame, food hopper means removably attached to said frame and having an upwardly directed input opening for receiving the food preparitory to being processed and a downwardly directed discharge opening, food support means disposed subjacent said food discharge opening for restingly engaging the lowermost portion of food contained within said hopper means, means for swingably attaching said food support means to said frame with said food support means being free to swing between a first position that is in alignment with said food discharge opening and a second position that is displaced from said food discharge opening, a carriage assembly slidably attached to said frame for slidable movement within a horizontal plane toward and away from said food hopper means, a food processable element removably attached to said carriage assembly for workingly engaging at least a portion of the food, drive means coupled to said carriage assembly for causing reciprocating movement thereof with said food processable element being arranged to cyclically pass beneath said food discharge opening, and ejector means coacting with said carriage assembly and said food support means for ejecting particles of processed food downwardly away from said food processable element by causing said food support means to be moved between said first and second position thereof, said ejector means including bias means for yieldably urging said food support means toward said first position thereof, said ejector means including means associated with said carriage assembly for engaging and cyclically driving said food support means from said first position to said second position thereof, said bias means returning said food supporting means to said first position thereof.

4,186,544

WRAPPING MACHINES

Reginald F. Johnson, Lea, near Gainsborough, England, assignor to Baker Perkins Holding Limited, Peterborough, England

Filed May 25, 1978, Ser. No. 909,467
Int. Cl.[2] B65B *11/38*
U.S. Cl. 53—537 **6 Claims**



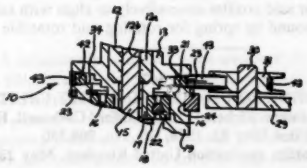
1. A wrapping machine comprising an intermittently rotating wrapping wheel having individual pockets for receiving in succession an article to be wrapped and a wrapper, the wrapping wheel being operative during its rotation to fold the wrappers partially around the articles and to bring the pockets, each containing a partially wrapped article, in succession to a transfer station, a continuously moving chain conveyor carrying a series of pushers, said pushers being arranged to move through the pockets of the wrapping wheel in succession as the pockets reach and while the pockets are stationary at the transfer station, to withdraw the partially wrapped articles from the pockets and traverse them in succession through a final wrapping station, stationary folder blades at said final wrapping station which extend generally parallel to said chain conveyor adjacent the two ends of the articles and which engage portions of the wrapper projecting from the ends of each article to complete the wrap of said articles, said pushers being constituted by pairs of fingers mounted on said chain conveyor adjacent opposite ends of the articles, said fingers engaging the partially wrapped articles to feed them in succession along a stationary support, and a control mechanism operative to move the fingers of each pair inwardly towards one another to positions clear of said stationary folder blades during passage of the articles past the folder blades.

4,186,545

CLUTCH-BRAKE MECHANISM

Marion E. Hutchison, 1241 Ackermant, Waterloo, Iowa 50703

Filed Nov. 25, 1977, Ser. No. 854,773
Int. Cl.[2] A01D *69/08*
U.S. Cl. 56—113 **4 Claims**



1. A clutch mechanism for a rotary mower comprising:

a first circular member having a pair of tapered circular surfaces thereon being rigidly attached to a drive shaft;

a second circular member having a pair of tapered circular surfaces thereon being rotatably journaled to said first circular member;

a mower blade rigidly attached to said second circular member;

means for selectively frictionally engaging the first and second circular members in a first position thereof for

substantially preventing rotation of one of said circular members with respect to the other of said circular member and moveable to a second position for allowing said circular members to rotate with respect to each other, said engaging means including a ring disposed around said first and second circular members and loosely abutting said tapered circular surfaces, a belt disposed around said ring, whereby a relatively small amount of energy will be required to engage and disengage said first and second circular members with respect to each other; and

means for controlling the movement of the engaging means between said first and second positions, said controlling means includes biasing means for biasing the engaging means into the second position thereof whereby said blade will be disengaged from turning with said drive shaft thereby providing a fail-safe function, said controlling means further including a pulley means for engagement with said belt and means for moving said pulley means to selectively tighten or loosen said belt whereby when said belt is tight against said ring said first and second circular members will turn together so as to transmit rotation from the drive shaft to said blade and when belt is loose, said blade will not be turned by said drive shaft.

4,186,546

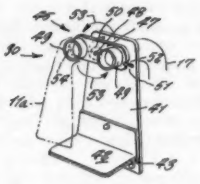
DISPOSABLE BAG MOUNTING FOR A LAWN MOWER

Manuel Machado, c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, and George Spector, 3615 Woolworth Bldg., 233 Broadway, both of New York, N.Y. 10007

Filed Aug. 18, 1978, Ser. No. 935,016

Int. Cl.[2] A01D *35/22*

U.S. Cl. 56—202 **3 Claims**



1. A lawn mower and disposable bag combination, comprising a disposable bag and a lawn mower with a platform on its rear for supporting said bag thereupon, a duct from an inverted dome around a grass clipping chamber of said mower extending upwardly, and a duct end aligned with a mouth of said bag, said platform being rearwardly downwardly pivotable about a hinge against an action of a spring loaded pin, a rotatable plate about a central stationary pin, a nozzle at each opposite end of said rotatable plate, said bag and a second disposable bag each fitted on said nozzles, a detent for retaining said rotatable plate in position for said nozzles successively to align with said duct end, and a wound up spring for rotating said rotatable plate.

4,186,547

MACHINE FOR HARVESTING SOFT FRUIT

Roland J. E. James, Kirkenel Farm, Ashford Carbonell, England

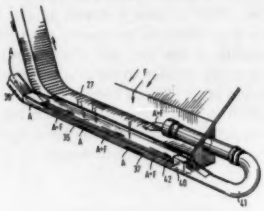
Filed May 22, 1978, Ser. No. 908,550

Claims priority, application United Kingdom, May 23, 1977, 21629/77

Int. Cl.[2] A01D *46/00*

U.S. Cl. 56—330 **8 Claims**

1. A machine for harvesting soft fruit and of the kind comprising a frame, ground engaging wheels for supporting said frame, traction means for driving said frame over the ground along a row of soft fruit bushes, a picking zone defined by said frame, guides for guiding branches of each bush into said picking zone as the machine traverses the bush, shakers for engaging the branches in said picking zone and shaking fruit therefrom, and fruit collecting and conveying means below said picking zone for collecting fruit shaken from the branches, wherein the fruit collecting means comprises a longitudinally extending open top channel into which fruit can fall and means for providing a flow of air along the channel to convey fruit along the channel, comprising an air flow source, an inlet



orifice at or near one end of the channel operatively connected to said source and directed towards the opposite end of the channel, and an outlet orifice at or near said opposite end of the channel and air flow means for drawing air away from the channel operatively connected to said outlet orifice.

4,186,548

BEARING FOR THE SPINNING ROTOR OF AN OPEN-END SPINNING ASSEMBLY

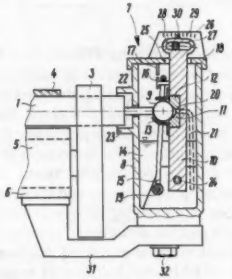
Fritz Stahlecker, Josef-Neidhart-Str. 18, 7341 Bad Uberkingen, Fed. Rep. of Germany, assignor to Fritz Stahlecker and Hans Stahlecker, both of, Fed. Rep. of Germany

Filed Apr. 27, 1978, Ser. No. 890,414

Claims priority, application Fed. Rep. of Germany, Apr. 14, 1977, 2716573

Int. Cl.[2] D01H *1/12, 7/12;* **F16C** *1/24, 19/12*

U.S. Cl. 57—58.89 **19 Claims**



1. Bearing arrangement for a rotor shaft of an open-end spinning assembly or the like of the type having a spinning assembly component which vibrates with rotation of the rotor shaft; said bearing arrangement comprising:

a ball wettable by lubricant and engageable with an end of the rotor shaft to axially support the rotor shaft,

step bearing housing means including retainer means for retaining said ball,

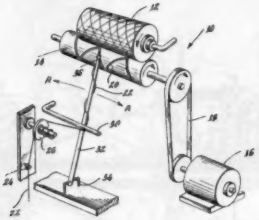
and supporting means for supporting the entire step bearing housing means on the component of the spinning assembly or the like which vibrates with rotation of the rotor shaft, wherein operational vibrations of said component are transmitted to said ball by way of vibrational movement of said supporting means and the entire step bearing housing means to thereby improve lubrication of said shaft and ball.

4,186,549

PACKAGING OF SELF-TWIST YARNS

Phillip W. Chambley, and Alan H. Norris, both of Rome, Ga., assignors to WWG Industries, Inc., Rome, Ga.

Filed May 30, 1978, Ser. No. 910,463
Int. Cl.[2] D02G 3/28; D01H 5/28, 7/92
U.S. Cl. 57—293 **7 Claims**



1. In an apparatus for packaging a self-twist yarn strand having nodes of zero twist along its length and opposite twist on either side of each node, said apparatus being provided with means for feeding said self-twist yarn strand onto a take-up device, said feed means including

guide means located adjacent to the surface of said take-up device to guide the strand along the surface of said take-up device, and

tension-applying means for applying tension to said strand as it is guided along the surface of said device,

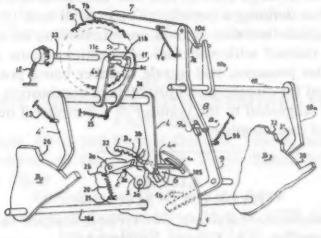
rotation-minimizing means located between the tension-applying means and the take-up device for minimizing rotation of the nodes of said yarn strand and concurrent loss of twist in said yarn strand as it is guided onto said take-up device, said rotation-minimizing means including an elongated guide rod between said tension applying means and take-up device about which said yarn strand is wrapped.

4,186,550

PROGRAMMER FOR ELECTRIC HOUSEHOLD APPLIANCES

Edouard Jouret, Bresso-Milano, Italy, assignor to Crouzet, Paris, France

Filed Jun. 6, 1978, Ser. No. 912,967
Claims priority, application France, Jun. 20, 1977, 77 19063
Int. Cl.[2] G04F 3/02, 8/00
U.S. Cl. 58—21.13 **4 Claims**



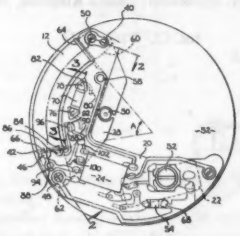
1. A programmer for electric household appliances comprising a reversing cam, a motor for continuously rotating said reversing cam, a programming cam assembly comprising a toothed driving cam and at least one programming cam driven by said driving cam, engageable and disengageable driving connection means between said reversing cam and said driving cam, a timing wheel, means forming a driving connection between said reversing cam and said timing wheel and control means for controlling engagement and disengagement of said driving connection means, said driving connection means including a first lever and a pawl each povotally mounted on said reversing cam, said pawl having a first position in which it drivingly engages the teeth of said driving cam and said first lever being engageable with said pawl to displace said pawl from said first position, said control means including a fixed plate formed with an opening, said first lever having a part received in said opening when said pawl is in driving engagement with the teeth of said driving cam, a second lever having a portion movable into said opening to displace said part of said first lever from said opening and cause said first lever to move said pawl out of engagement with the teeth of said driving cam, means for moving said portion of said second lever into said opening comprising a third lever moveable with said second lever and engaging said programming cam, said programming cam having a profile portion effective to move said third lever causing said portion of said second lever to move into said opening and means for displacing said portion of said second lever from said opening to cause said pawl to re-engage the teeth of said driving cam comprising a fourth lever moveable with said second and third levers and a cam surface on said timing wheel for engaging and moving said fourth lever to displace said portion of said second lever from said opening.

4,186,551

ELECTRONIC TIMEPIECE STRUCTURE

Yasuaki Nakayama, Hanno, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 675,637, Apr. 9, 1978, abandoned. This application Apr. 3, 1978, Ser. No. 892,403
Int. Cl.[2] G04C 3/00
U.S. Cl. 58—23 R **8 Claims**



1. A structure for a quartz wrist watch of the type comprising a pillar plate, a motor and a circuit board having an electrical lead pattern formed thereon provided superjacent said pillar plate and a stator of said motor provided on said plate comprising a yoke, a core provided adjacent said yoke and a bobbin provided about said core having wire wound around, said structure being characterized by:

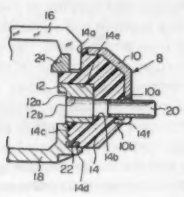
said yoke being fixed to said plate;

said bobbin being subjacent said circuit board and superjacent said pillar plate, said bobbin further being fixed directly to a lower surface of said circuit board;

said wire wound on said bobbin being extended directly to and electrically coupled to said electrical lead pattern; and

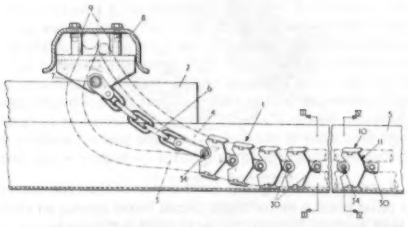
a fastening means for magnetically and mechanically coupling said yoke to said core and for positioning said circuit board on said plate, said means being a removable screw.

4,186,552
WRISTWATCH CASE
Hisao Ishigaki, Tokyo; Ryuzo Tanaka, Tanashi, and Koichi Nakajima, Tokyo, all of Japan, assignors to Citizen Watch Co., Ltd., Japan
Filed Nov. 29, 1977, Ser. No. 855,802
Claims priority, application Japan, Nov. 30, 1976, 51-143026
Int. Cl.[2] G04B *37/06, 39/00*
U.S. Cl. 58—88 W 9 Claims



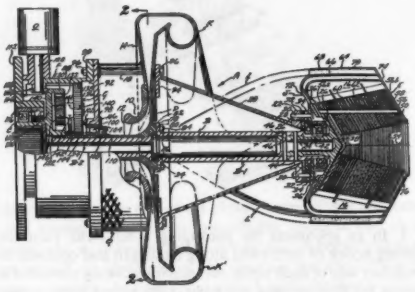
1. A wristwatch case comprising:
a watchglass;
a case body for retaining said watchglass and including an outer shell made of a metallic sheet plate, an inner shell having an outer peripheral wall a major portion of which is held in intimate contact with an inner wall of said outer shell and having an inwardly facing annular recess, and an annular metallic reinforcing member disposed in the inwardly facing annular recess of said inner shell, said inner shell being formed by injection molding a synthetic resin to form a one piece structure with said outer shell and said annular reinforcing member, and said inner shell having a recessed portion to which said watchglass is fitted; and
a back cover secured to the inner shell of said case body.

4,186,553
CABLE PROTECTION EQUIPMENT
Kevin Fitchett, Aston-on-Trent, England, assignor to Coal Industry (Patents) Limited, England
Filed May 8, 1978, Ser. No. 903,874
Claims priority, application United Kingdom, May 10, 1977, 19553/77
Int. Cl.[2] F16L *3/14*
U.S. Cl. 59—78.1 10 Claims



1. A link adapted to be pivotally attached to similar adjacent links to provide a chain for protecting a plurality of flexible supply components leading to equipment which in use repeatedly traverses to and fro, the link comprising two elements in engagement with each other, one of said elements defining an open sided passageway for containing said plurality of flexible supply components which elements when connected define a closed passageway around any such flexible supply components, the open side forming a part of the closed passageway when said elements are connected, and which other of said elements can be at least partially disconnected to permit access to the passageway, both the elements having means capable of being pivotally attached to elements of adjacent links.

4,186,554
POWER PRODUCING CONSTANT SPEED TURBINE
Clarence R. Possell, 4842 Viane Way, San Diego, Calif. 92110
Continuation-in-part of Ser. No. 630,430, Nov. 10, 1975, abandoned. This application Oct. 25, 1977, Ser. No. 845,441
Int. Cl.[2] F02C *3/04*
U.S. Cl. 60—39.37 28 Claims

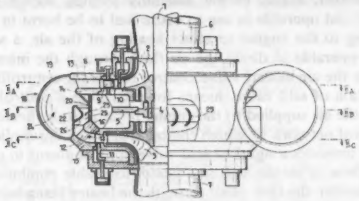


1. A turbine system comprising:
(a) power take-off means being rotationally displaceable about a longitudinally extending axis of rotation, said power take-off means being rotatably mounted within a first housing;
(b) compressor rotor means mounted within a housing assembly having at least one diffuser tube extending in a radial outward direction from said axis of rotation direction for discharge of air from said compressor rotor means;
(c) at least one volute casing member in fluid communication with said diffuser tube for directing said air in a predetermined path;
(d) fuel combustion means coupled to said volute casing for issuing products of combustion of said air and a fuel combusted in said combustion means; and,
(e) turbine rotor means mounted within a second housing, said turbine rotor means being coupled to said power take-off means by a rotational shaft member extending in said longitudinal direction through said compressor means, said turbine rotor means including (1) a plurality of disc members displaced each from the other in said longitudinal direction to form a plurality of circular passages extending from an outer portion to an inner passage formed through each of said disc members, said plurality of discs defining a peripheral outer wall and, (2) at least one nozzle member in fluid communication on opposing ends thereof with said fuel combustion means and said circular passages, said nozzle member being positionally located for directing said products of combustion substantially tangential to the contour of a peripheral outer wall of said disc members.

4,186,555
HYDRAULIC MACHINE
Michel Fauconnet, Marchissy, Switzerland, assignor to Ateliers des Charmilles, S.A., Geneva, Switzerland
Filed Jun. 28, 1978, Ser. No. 919,959
Claims priority, application Switzerland, Jul. 18, 1977, 8854/77
Int. Cl.[2] F16D *33/00*
U.S. Cl. 60—330 7 Claims

1. A hydraulic machine having a turbine and a pump orientated for the same direction of rotation and comprising a casing connected to an upper inlet pipe, blades interposed between the casing and the turbine and pump wheels, the turbine and the pump being mounted, spaced one from the other, on a

common shaft and their respective inlets being orientated in opposite directions, and including a pump inverter housed at least partially inside the casing which is provided with an



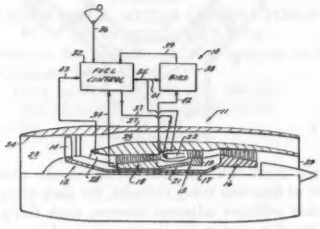
internal separating wall dividing it into two chambers, one of which constitutes the volute of the turbine into which the pump inverter discharges.

4,186,556

COMPRESSOR BLEED BIASED ACCELERATION SCHEDULE

William C. Lowry, West Chester, and William L. Phipps, Cincinnati, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed May 29, 1975, Ser. No. 581,752
Int. Cl.[2] F02C *9/02*
U.S. Cl. 60—39.03 **6 Claims**



1. An improved fuel control system for a turbine engine of the type having a compressor from which a portion of the air can be bled off and a fuel control system responsive to engine operating parameters wherein the improvement comprises:

a. means for sensing the amount of air that is bled off from the compressor; and

b. means for biasing the fuel control system as a function thereof to increase the acceleration fuel schedule.

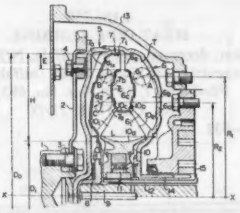
4,186,557

TORQUE CONVERTER WITH NARROWED FLOW PASSAGES

Hajime Arai, Aichi, and Kiyoshi Oonuma, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jan. 16, 1979, Ser. No. 3,869
Claims priority, application Japan, May 22, 1978, 53/61266
Int. Cl.[2] F16D *33/00, 33/20*
U.S. Cl. 60—361 **7 Claims**

1. A hydraulic torque converter which comprises an impeller, a stator, and a turbine, each of which is provided with vanes, wherein the space through which fluid circulates is of the form of the space between an inner and an outer torus which are coaxial, wherein a section through the toruses by a plane containing their axis consists of an annulus which is defined by an inner closed curve provided by the intersection of the plane and the inner torus and an outer closed curve provided by the intersection of the plane and the outer torus, wherein the dimension parallel to the axis of the toruses of the outer closed curve is smaller than its dimension in the direction perpendicular to this axis, and wherein, considering a circle inscribed between the inner and outer closed curves and touching both of them and passing round the annulus, the value



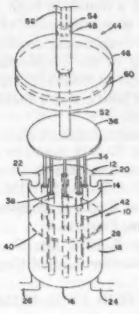
which is the product of the radius of such a circle and the distance of its center from the axis of the toruses alters, as the center of the circle passes around at least the portion of the annulus which corresponds to the turbine, from a maximum value at the inlet of the turbine to a minimum value which is substantially smaller than this maximum value.

4,186,558

THERMAL CONVERSION ENGINE

Sheafen F. Kuo, 40 Croft Pl., Staten Island, N.Y. 10314

Filed Apr. 10, 1978, Ser. No. 894,910
Int. Cl.[2] F03G *7/06*
U.S. Cl. 60—527 **1 Claim**



1. An engine for converting thermal energy into mechanical energy, comprising:

an outer container having a system of ports for providing a hot fluid input port, cold fluid input port, and output ports for the hot and the cold fluid;

at least one cylinder positioned in said container, a liquid in said cylinder, a piston on the surface of said liquid and a piston rod extending from said piston; and

an output means coupled to said piston rod, whereby the liquid in said cylinder is periodically frozen and melted by a repetitive succession of cold fluid and hot fluid in said container, thereby causing said piston rod to reciprocate said output means as the volume of liquid changes between its frozen and melted states, wherein said system of ports comprises four separate ports, two of which accommodate cold fluid input and output, and two of which accommodate hot fluid input and output, and wherein said container is hollow and is of elongated shape, and comprises a top and bottom cover at respective opposite ends of said container, said top cover having openings therein through which extend said piston rod, and wherein said hot fluid input and output ports are located adjacent to

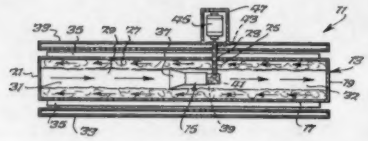
one end of said container, said cold fluid input and output ports are located adjacent to the other end of said container, and further comprising a thermal separator transversely positioned within said container and freely movable in a longitudinal direction.

4,186,559

HEAT PIPE-TURBINE

Bert J. Decker, deceased, late of Buffalo, N.Y., and by Jean S. Decker, executrix, 136 Copen Blvd., Buffalo, N.Y. 14226

Filed Jun. 7, 1976, Ser. No. 693,195
Int. Cl.[2] F01K *27/00*
U.S. Cl. 60—531 **15 Claims**



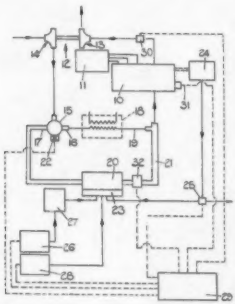
1. A heat pipe-turbine assembly which comprises: a heat pipe-turbine, which includes a heat pipe having evaporating and condensing sections, means for heating the evaporating section, means for cooling the condensing section, a vaporizable liquid in the pipe, return means for returning condensate from the condensing section to the evaporating section and a turbine inside the heat pipe so located that fluid evaporated in the evaporating section of the heat pipe passes through the turbine as a gas and drives it, after which said gas is condensed to a liquid in the condensing section and is returned to the evaporating section as a liquid through the return means; and an auxiliary heat pipe so positioned as to extract heat from the means for heating the evaporating section of the heat pipe-turbine after said heating of the evaporating section is effected and to transfer said heat to means for heating the evaporating section to increase the heat content thereof before said evaporating section is heated.

4,186,560

INTERNAL COMBUSTION ENGINES

George Frankl, Kenton, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Mar. 8, 1978, Ser. No. 884,486
Claims priority, application United Kingdom, Mar. 12, 1977, 10575/77
Int. Cl.[2] F02B *37/00*; F02M *31/04*
U.S. Cl. 60—599 **1 Claim**



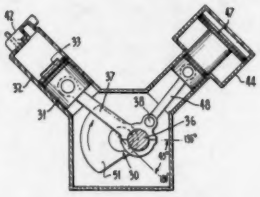
1. An internal combustion engine system including a compression ignition engine, a turbosupercharger for supplying air under pressure to the engine, means for supplying fuel to the combustion spaces of the engine, an intercooler operable to cool the air flowing to the air inlet manifold of the engine through the compressor of the turbo charger, an air heater for heating the air flowing to the air inlet manifold through the compressor, a fuel burner assembly located within the air heater and operable in use to cause fuel to be burnt in the air flowing to the engine to effect heating of the air, a selector valve operable to direct the air flow through the intercooler and/or the air heater, valve control means for controlling the operation of said valve, means for providing a control signal when the air supplied to the engine requires to be heated, and a control network to which the control signal is supplied and which provides a signal to said valve control means to cause a small flow of air through said heater to enable combustion to start therein, the flow of air through the heater being increased when combustion has started whilst the flow of air through the intercooler is decreased.

4,186,561

SPLIT CYCLE INTERNAL COMBUSTION ENGINES

John D. Wishart, 8 Chapel St., Blackburn, Victoria, 3130, Australia

Filed Sep. 21, 1978, Ser. No. 944,653
Claims priority, application Australia, Sep. 22, 1977, PD1772; Jun. 29, 1978, PD4909
Int. Cl.[2] F02B *73/00*
U.S. Cl. 60—620 **13 Claims**



1. A split cycle internal combustion engine comprising a crankshaft, at least one firing cylinder, for each firing cylinder an expansion cylinder adjacent thereto, each firing cylinder having a transfer port in the lower region of the combustion chamber communicating with the top of the adjacent expansion cylinder, a multistage compressor comprising at least two cylinders operating in series, a piston in each cylinder, means directing air supplied by the high pressure stage of the compressor to the combustion zone of each firing cylinder during the first part of the power stroke, means supplying fuel to the combustion zone of each firing cylinder to mix intimately in the correct proportion with the entering compressed air, means external of each firing cylinder heating the air before entry to the top of the combustion zone, and means controlling the timing of the admission of fuel and of compressed air to each firing cylinder in relation to the position of the piston in said firing cylinder.

4,186,562

CRYOGENIC REFRIGERATION FOR VEHICLES

Lewis Tyree, Jr., 145 Briarwood Ave., North, Oak Brook, Ill. 60521

Continuation-in-part of Ser. No. 737,440, Nov. 1, 1976, Pat. No. 4,127,008. This application Jul. 24, 1978, Ser. No. 927,455
Int. Cl.[2] F17C *7/02*
U.S. Cl. 62—62 **17 Claims**

1. A method for cooling the cargo compartment of a refrigerated vehicle using carbon dioxide, which method comprises

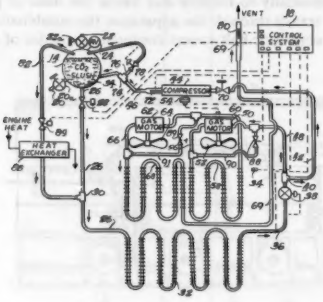
providing reservoir of liquid CO_2 and solid CO_2 in the form of CO_2 slush in a storage tank carried by the vehicle,

separating liquid CO_2 from the slush and transferring the separated liquid from the tank to first heat-exchange means,

vaporizing said transferred liquid CO_2 in said first heat-

exchange means by heat transfer from the cargo compartment atmosphere while maintaining a vapor pressure of at least about 75 psia therein,

returning at least a portion of said CO_2 vapor stream from



said first heat-exchanger to said vehicle storage tank where additional liquid CO_2 is created by melting solid CO_2 in said slush, and

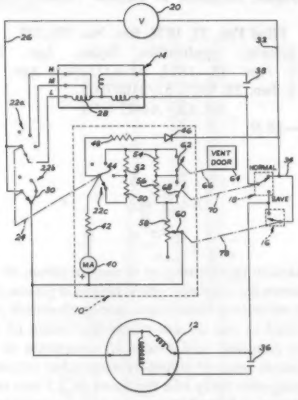
eventually venting at least a portion of said CO_2 vapor stream.

4,186,563

COOLING EFFICIENCY METER CIRCUIT FOR AN AIR CONDITIONER

James L. Schulze, Sr., Middletown, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Apr. 24, 1978, Ser. No. 898,739
Int. Cl.[2] F25B *49/00*; G05D *23/00*
U.S. Cl. 62—126 **4 Claims**



1. A cooling efficiency circuit for an air conditioner of the type having a plurality of manually adjustable parameters, changes in which parameters result in changes in the long term energy consumption of said air conditioner, said circuit comprising

means for detecting the status of each of said parameters,

integrating means responsive to said detecting means for generating an analog signal representative of the combined effects of each parameter upon said energy consumption, and

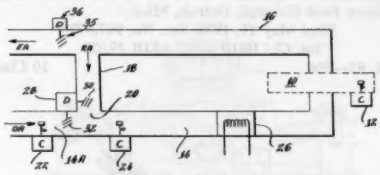
means for displaying said signal for providing an indication of a change in said energy consumption caused by a change in the status of said parameters.

4,186,564

AIR VENTILATION SYSTEM

Melvin Myers, 1621 Gulf Blvd., Clearwater, Fla. 33515

Filed Sep. 23, 1977, Ser. No. 836,002
Int. Cl.[2] F24F *3/00*
U.S. Cl. 62—180 **12 Claims**



1. An air conditioning system comprising a space thermostat controller for maintaining a range of desired temperature of air in said space, and outside air controller determining the mode of cooling said space when said space thermostat determines said space is to be cooled, said modes including mechanical cooling and natural cooling, a mixing chamber for mixing return air from said space with outside air for natural cooling, damper means for controlling the relative mixture of said return and outside air to said mixing chamber, a mixed air controller positioned with respect to said mixing chamber for sensing the temperature of said mixed air, said mixed air controller settable at a set point temperature within a range of ambient temperatures and having a preset switch differential at any particular temperature, control means coupled to said mixed air controller and responsive to said mixed air controller for adjusting the position of said damper means, said control means including drive means for continuously moving said damper means across its entire operating range in accordance with the state of said mixed air controller, said bidirectional damper means modulating between said set point temperature and said set point temperature minus said switch differential of said mixed air controller, thereby maintaining said desired air temperature in said space, wherein said drive means drives at a slow and substantially constant rate in either of two directions, at a lesser rate than the response rate of the mixed air control, thereby causing said modulating of said damper, the mixed air control reaching the actual mixed air temperature before the dampers can overcompensate.

7. An air conditioning economizer system utilizing natural and mechanical cooling modes, comprising a closed space, an air inlet duct, air outlet duct, air return duct and outside air inlet, said outside air inlet and return duct meeting in a mixing chamber, a space thermostat controller for determining whether said space is to be cooled or not to be cooled, an outside air controller sensing enthalpy of said outside air for determining the mode of cooling said space when said space controller demands cooling, said air return duct and said outside air duct each including a damper, the position of each said damper determining the relative mixture of outside air and recirculated air for said natural cooling mode, a mixed air controller having a preset set point temperature and a preset switch differential temperature setting for sensing the temperature of said mixed air, a damper drive means acting to bidirectionally drive each said damper at a constant rate in opposing directions to control the proportions of said mixture, said drive means responsive to said mixed air controller to drive said dampers until said mixed air controller indicates that its set point has been surpassed, whereupon said drive means reverses the movement of damper drive until said mixed air controller senses an air flow temperature of said set point minus said switch differential, said continuous reversing action of said damper causing a modulating damper condition, thereby providing a desired temperature range within said closed space, wherein said drive means drives at a slow and substantially constant rate in either of two directions, at a lesser rate than the response rate of the mixed air control, thereby causing said modulating of said damper, the mixed air control reaching the

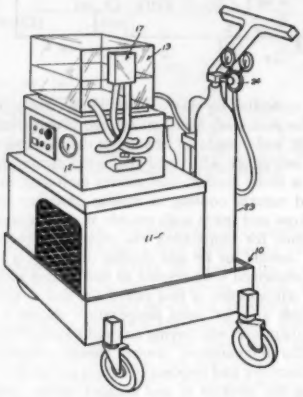
actual mixed air temperature before the dampers can overcompensate.

4,186,565

PERFUSION SYSTEM FOR ORGAN PRESERVATION

Luis H. Toledo-Pereyra, Grosse Pointe Farms, Mich., assignor to Henry Ford Hospital, Detroit, Mich.

Filed May 19, 1978, Ser. No. 907,878
Int. Cl.[2] B01F *3/04*; A61B *19/00*
U.S. Cl. 62—306 **10 Claims**



1. A perfusion system for organ preservation comprising
a wheeled cart,
a refrigeration unit on said cart having coolant inlet and outlet lines,
a pump unit removably mounted on said cart and having pump inlet and outlet lines,
and a cassette removably mounted on said cart and including an organ receptacle for receiving the organ, a heat exchanger, a bubble trap having an inlet line and an outlet line, a membrane oxygenator having an inlet and an outlet line, and an ice deposit area,
said heat exchanger being connected to the inlet and outlet lines of the refrigeration unit and having perfusate inlet and outlet lines connected to the outlet line of the said oxygenator and the inlet line of the pump unit,
said bubble trap having an inlet line connected to the outlet line of said pump unit,
said outlet line of said bubble trap being adapted to be connected to the organ,
said oxygenator having a gas inlet line,
and a gas tank on said cart connected to said gas inlet line.

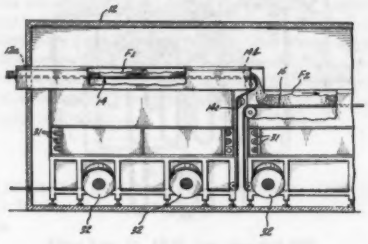
4,186,566

MODIFIED WIRE MESH CONVEYOR BELT FOR AIR FLUIDIZATION TYPE FOOD FREEZERS

David K. Y. AuYoung, Vancouver, Canada, assignor to Lewis Refrigeration Co., Redmond, Wash.

Filed Apr. 24, 1978, Ser. No. 899,555
Int. Cl.[2] F25D *25/04*
U.S. Cl. 62—380 **5 Claims**

1. In apparatus for IQF freezing of food particles and the like massed in air-fluidized state on a moving conveyor belt, the combination comprising elongated flexible endless wire mesh conveyor belt means having a substantially horizontal belt stretch upon which the particles are deposited to a depth subject to variation of thickness or permeability to airflow over the area of said belt stretch for conveyance of the particles through the apparatus, enclosure means associated with said belt stretch and forming compartment spaces respectively above and below said belt stretch and associated air pressurization and freezer apparatus operable to create a pressure difference of air in said compartments that causes forceable upward flow of freezing air through the open mesh of said belt stretch and the mass of particles thereon over the area of said stretch at sufficiently depressed temperature and with sufficient flow velocity substantially to fluidize and freeze the mass of particles while in transit through the apparatus; the combination of a wire mesh conveyor belt means comprising a series of elongated substantially helical wire links individually disposed transversely to the length of the belt stretch in the plane thereof and successively interconnected, and a plurality of elongated rod elements inserted lengthwise through the successive helical links across the width of the belt, said rod elements having a flow obstructing cross section that materially reduces the open flow area through the belt mesh and confines the upward flow through the belt to the mesh openings between rods totalling a minor fraction of the total belt area.



4,186,567

ORNAMENT UTILIZING RARE EARTH-COBALT MAGNET

Souhei Monden, Inuyama, and Sadaharu Takimoto, Kumagaya, both of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Feb. 27, 1978, Ser. No. 881,239
Claims priority, application Japan, Apr. 18, 1977, 52/47736[U]; Apr. 18, 1977, 52/47737[U]; Apr. 18, 1977, 52/47738[U]; Jun. 22, 1977, 52/81007[U]
Int. Cl.[2] A44C *7/00*
U.S. Cl. 63—14 R **22 Claims**

1. An ornament comprising an ornament piece, an attracting piece and means for mutually attracting said pieces, the means for mutually attracting including a rare earth-cobalt permanent magnet secured to one of said pieces and being of a size and construction adapting said pieces to cooperate to produce, when said pieces are confronted by each other across an interposed non-magnetic body of a thickness of 2.5 mm or larger, a magnetic attracting force between said pieces ranging between 30 and 100 grams per square centimeter of area of contact of said pieces with said body and greater than 30 grams per gram weight of said ornament.

4,186,568

TUNABLE LINK

Amnon Katz, 401 Forrest Hill La., Grand Prairie, Tex. 75051

Filed Aug. 1, 1977, Ser. No. 820,469
Int. Cl.[2] F16C *1/00, 3/00*
U.S. Cl. 64—1 V **3 Claims**

1. In a control rod for the transmission of axial signals that is subject to forced transverse vibrations, apparatus comprising:

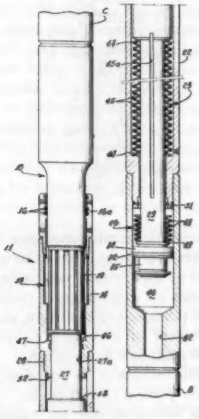
a universal joint disposed in series in said rod,
a resilient bendable member rigidly coupled to said rod on either side of the universal joint,
said resilient bendable member comprising a member generally in the form of a sleeve with cutout portions surrounding the said universal joint,
said cutout portions being selected in size and shape to effect the detuning of the natural frequency of the control rod from the frequency of the forced vibrations.

4,186,569

DUAL SPRING DRILL STRING SHOCK ABSORBER

James T. Aumann, Salt Lake City, Utah, assignor to Christensen, Inc., Salt Lake City, Utah

Filed Feb. 21, 1978, Ser. No. 879,237
Int. Cl.[2] F16D *3/06;* E21B *7/42*
U.S. Cl. 64—23 29 Claims



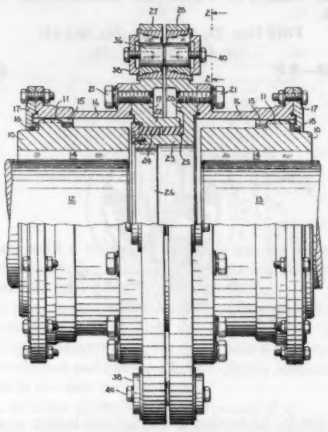
1. A shock absorber for well drilling strings comprising: an enlongated telescopic structure including an inner tubular body and an outer housing having means for connecting said structure in a well drilling string for conducting well drilling fluid through said structure; rotary drive means between said body and said housing; and first and second compression spring means in said housing engageable between said body and said housing for alternately cushioning telescopic contraction and extension of said structure.

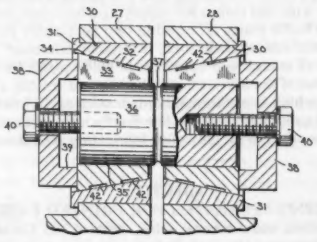
4,186,570

SHEAR PIN COUPLING

Glenn C. Pokrandt, Menomonee Falls, Wis., assignor to The Falk Corporation, Milwaukee, Wis.

Filed May 11, 1978, Ser. No. 904,732
Int. Cl.[2] F16D *3/56, 7/00*
U.S. Cl. 64—28 R 3 Claims





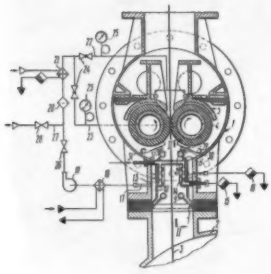
1. A shear pin flexible coupling for connecting two shafts, comprising:
two coupling halves each connectable to one of said shafts and each including a radially extending annular flange spaced from and confronting the flange of the other half, said flanges having spaced bores which can be aligned with the like bores of the opposite flange;
an outer bushing fitted into each bore, each outer bushing having a central opening the surfaces of which tapers inwardly toward the gap between the flanges;
an inner bushing having a single split and being received in each outer bushing, said inner bushing having a central opening and an outer surface which is tapered to complement the taper of the outer bushing;
elongated shear pins extending across the gap and having two circular cylindrical ends of like diameter disposed within the tapered inner bushings, and a central annular groove disposed in said gap; and
means for forcing the inner bushings in the direction of the gap to rigidly grasp the shear pins with an interference fit,
said forcing means each comprising a circular loading plate having a rim which bears against the outer end of the split bushing and having a central bore, and
a headed bolt having its shank extending through the central bore and threaded received into one end of the shear pin.

4,186,571

DEVICE FOR LUBRICATION OF ROLLER SEAL

Leonid G. Gorodissky; Raisa V. Vasilieva; Vyacheslav I. Zhmurov; Mikhail D. Kozlov; Vera I. Kuzmina, all of Moscow, U.S.S.R., and Nikolai T. Romanov, deceased, late of Moscow, U.S.S.R. (by Anastasia I. Romanova, administratrix), assignors to Vsesojuzny Nauchno-Issledovatelsky I Experimentalny Institut Po Pererabotke Khimicheskikh Volokon, U.S.S.R.

Filed Dec. 27, 1977, Ser. No. 864,437
Int. Cl.[2] D06B *23/18*
U.S. Cl. 68—5 E 4 Claims



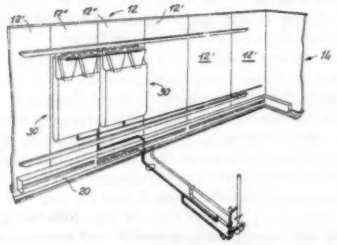
1. A device for lubrication of a roller seal including parallel rollers rotating in contact with one another and adapted to pass between them the treated fabric in a vertical plane; said device comprising a roller lubricating pipe line having a discharge end associated with said rollers for supplying a lubricant thereover, a group of baffle plates arranged in two tiers under the rollers in the fabric conveyance zone; a circular container defined outwardly of at least said upper tier of baffle plates for collecting a surplus of the lubricant supplied to said rollers; a tubular air heater which is in thermal contact with said circular container, and a recirculating pipe line fluidly interconnecting said circular container with the roller lubricating pipe line.

4,186,572

STEAMING APPARATUS FOR PRINTED FABRICS

Amedeo Arioli, and Lorenza Arioli, both of via Colombo 20, 21040 Gerenzano (Varese), Italy

Filed Oct. 2, 1978, Ser. No. 947,577
Claims priority, application Italy, Oct. 6, 1977, 28335 A/77
Int. Cl.[2] D06B *3/10, 3/30, 23/00*
U.S. Cl. 68—5 C 10 Claims



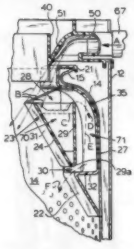
1. An improved apparatus for steaming printed fabrics, in particular for selectively treating or processing printed fabrics in a chamber essentially saturated with steam wherein the chamber is open at the bottom and comprises means for admitting a fabric to be steamed into said chamber and for removing said fabric from said chamber, said chamber comprising a pair of side walls, an upper wall connecting said side walls, said upper wall and said side walls having double walls which define an interior passage therebetween, means for generating steam in said interior passage, a steam inlet at the uppermost point of the chamber for introducing the generated steam into the chamber, humidifying channels in said chamber, wherein the steam present in said chamber is caused to circulate through said humidifying channels, means for detecting the temperature in the chamber, humidifying means in said chamber responsive to a temperature increase above a predetermined value in the chamber for supplying additonal humidity to said chamber, said humidifying means including means for introducing water in the form of a mist into the steam circulating through said humidifying channels, said humidifying channels being essentially U-shaped and comprising a downwardly directed inlet portion, an intermediate portion connected to said downwardly directed inlet portion for reversing the direction of flow and an upwardly directed outlet portion connected to said intermediate portion, nozzles associated with said humidifying channels for supplying pressurized steam to said channels, said nozzles being arranged and oriented in said downwardly directed portion for establishing therein a dynamic steam entraining effect from the chamber to assure the circulation of the steam through said channels, and means for collecting the supplied water, which is not vaporized, in said channels whereby the water is prevented from entering in liquid state said chamber.

4,186,573

RINSE OUT CENTRIFUGALLY OPERATED DISPENSER FOR AUTOMATIC WASHER

Robert A. Brenner, St. Joseph Township, Berrien County, and Victor W. Cuthbert, Sodus Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Feb. 21, 1979, Ser. No. 13,009
Int. Cl.[2] D06F *39/02*
U.S. Cl. 68—12 R 8 Claims



1. For use in an automatic laundry appliance having a circular rotatable spin basket containing items to be washed, an inlet means disposed above an upper rim of said basket for supplying wash liquid, and means for controlling a cycle of operation including an agitation portion, a spin portion, and a spray rinse portion, the improvement of a rinsable liquid additive dispenser for said laundry appliance comprising:

a first selectively fillable receptacle for containing said additive during said agitation portion of said cycle,

said first receptacle having an inlet for receiving said additive and for receiving a supply of liquid from said appliance inlet means during said spray rinse portion to clean said dispenser; and

a second receptacle communicating with said first receptacle for receiving said additive from said first receptacle during said spin portion, said second receptacle containing said additive received during said spin portion,

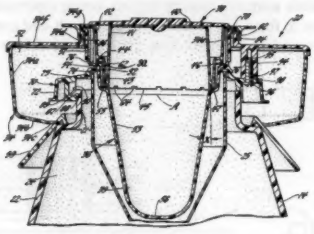
said second receptacle having an outlet for discharging said received additive at the end of said spin portion of the cycle; and

a mounting means for mounting said additive dispenser on said upper rim of said basket.

4,186,574
FABRIC SOFTENER DISPENSER FOR VERTICAL AGITATOR

John A. Sundstrom, Springboro, Ohio, assignor to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Dec. 4, 1978, Ser. No. 965,898
Int. Cl.[2] D06F *39/02*
U.S. Cl. 68—17 A **2 Claims**

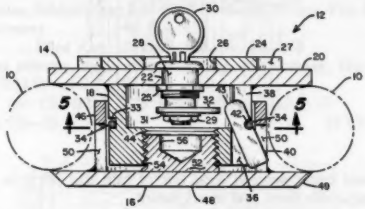


1. In a rinse agent dispenser adapted for mounting on an agitator for rotation and vertical reciprocation therewith and including an open top storage chamber for receiving and containing a rinse agent and having outflow ports above upwardly diverging wall means therein for releasing said rinse agent from said storage chamber by centrifugal force during rotation of said dispenser, means forming a dispensing compartment radially outwardly from said storage chamber and in continuous communication therewith through said outflow ports for receiving and retaining the rinse agent released from said storage chamber and for releasing said rinse agent at the close of said dispenser rotation, and a cap for covering the open top of said storage chamber and removable therefrom for filling said storage chamber with rinse agent, the improvement comprising a separable, three-part assembly including said cap, said storage chamber and said dispensing compartment, said dispensing compartment being in the form of an outer container and said storage chamber being in the form of a removable cup with a lip defining its open top, said outer container defining a radially inwardly opening annulus with a rim circumscribing the annulus internally thereof to define therewith an inlet to and an outlet from said dispensing compartment, said rim having an opening for telescopically receiving said cup sufficiently into said outer container to position the lip of said cup on said outer container with said outflow ports adjacent the inlet to said outer container, and means on said cap for retaining said rinse agent in said storage chamber during reciprocation of said dispenser, said retaining means cooperating with the wall means of said storage chamber to form a labyrinth seal by extending telescopically into said cup in sufficiently close proximity to said wall means below said outflow ports to interrupt communication between said storage chamber and said outer container during reciprocation of said dispenser without interrupting communication between the storage chamber and said outer container during rotation of said dispenser, said cap being fastenable to said outer container in a manner to sandwich said lip between the cap and outer container while forcing said retaining means into cooperating proximity to said wall means for holding the three parts in assembled relationship and being user removable therefrom to permit separation of said three-part assembly for easy cleaning of each part thereof and for convenient removal of said cup to permit filling of said storage chamber remote from said dispenser assembly.

4,186,575
TRAILER HITCH RING LOCK

Marshall R. Bulle, 918-3rd St., Farmington, Mich. 55024

Filed Oct. 2, 1978, Ser. No. 947,484
Int. Cl.[2] B60R *25/00*; E05B *27/36*
U.S. Cl. 70—14 **6 Claims**



1. For use with a trailer type vehicle having a generally toroidal shaped coupling hook, locking apparatus for inhibiting the unauthorized use of said trailer comprising:

(a) a first plate having an aperture therethrough and a tubular cylinder projecting from a first side surface thereof, said tubular cylinder being threaded over a predetermined portion thereof and having a longitudinally extending slot formed in the side wall thereof;

(b) a bar member pivotally mounted in said slot;

(c) a key operated lock assembly secured in said aperture and having a cam member affixed thereto for rotation when a key is inserted in said lock and turned, said cam member cooperating with said bar member for pivoting at least a portion of said bar member into and out of said slot; and

(d) a second plate having first and second generally concentric cylinders extending outwardly from a first side thereof, said first cylinder on said second plate being tubular and having an inner diameter which is greater than the outer diameter of said cylinder projecting from said first plate and having at least one longitudinal slot formed in the side wall thereof, said second cylinder on said second plate being threaded along a portion thereof, the arrangement being such that when the key operated lock is in a first condition, said threaded portions of said cylinder projecting from said first plate may be engaged with the threaded portion of said second cylinder projecting from said second plate by rotating said first plate relative to said second plate, but when said key operated lock is in a second condition, said bar will extend outward from said longitudinal slot in said tubular cylinder projecting from said first plate and into said longitudinal slot formed in the side wall of said first concentric cylinder projecting from said second plate to prevent relative rotation of said first and second plates.

4,186,576
VEHICLE LOCKING DEVICE

Howard W. Means, 5777 NE. Cascade, West Linn, Oreg. 97068, and Edward Allick, 812 6th St., Oregon City, Oreg. 97045

Filed Mar. 16, 1978, Ser. No. 887,181
Int. Cl.[2] E05B *71/00*
U.S. Cl. 70—233 **6 Claims**

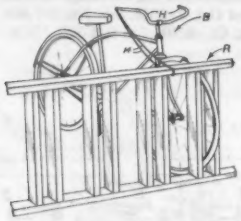
1. A locking device for securing a vehicle to an object comprising:

an elongate cable with enlarged end portions;

insert means adapted to be detachably mounted within a chamber opening defined on the vehicle;

said insert means including locking means for selectively locking said insert means in said opening;

said insert means having receiving means provided thereon for receiving and holding said enlarged end portions of



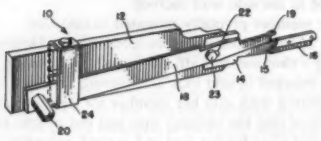
said cable, with at least one of said end portions being separable from said insert means.

4,186,577

LOCK OPENING DEVICE

Robert L. Jarm, Wauconda, Ill., assignor to Credit Industry Associates, Inc., Arlington Heights, Ill.

Filed Jul. 17, 1978, Ser. No. 924,978
Int. Cl.[2] E05B *19/20*
U.S. Cl. 70—394 **10 Claims**



1. A device for opening a lock of the type wherein a lock core having a key slot formed therein rotates within a fixed housing, a series of spring-loaded tumblers being located between said core and housing which must be brought into alignment along the shear line therebetween in order to permit the rotation of said core, said device comprising:

a holder having a key blank corresponding to the key slot formed in said core mounted at one end thereof;

a resilient member secured to said key blank in a position such that it engages said tumblers when said key blank is inserted into said key slot;

a means secured to said holder for engaging said housing on the side thereof opposite said tumblers and for urging said key blank and core against said engaged side in a manner such that the width of the shear line between said core and housing will be increased at the location of said tumblers, whereby adjusting the alignment of said key blank within said core will cause said spring-loaded tumblers to deform said resilient member at various depths until they are brought into proper alignment along said shear line thereby permitting the rotation of said core within said housing.

4,186,578

TAMPER PREVENTING LOCK

Frederick A. Sommer, 4238 Sibley Ave., Cincinnati, Ohio 45236

Filed Jan. 9, 1978, Ser. No. 867,815
Int. Cl.[2] E05B *17/00*
U.S. Cl. 70—419 **11 Claims**

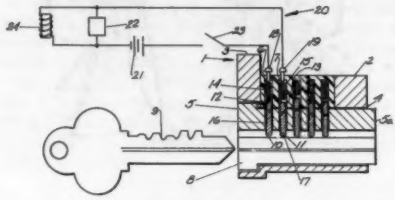
1. A tamper preventing lock comprising:

(a) a shell housing having a cylinder core accepting axial bore therein, said housing including a plurality of driver accepting apertures therein in parallel spaced relationships communicating at one end with said bore;

(b) a cylinder core rotatably mounted within said axial bore, said core containing a keyway adapted to receive a key and a plurality of driver receiving apertures therein in parallel spaced relationship communicating at one end with said keyway,

(c) a pin-like driver slidably received in each of said housing apertures and extending into said core apertures when said lock is in a locked position, at least two of said drivers being electrically conductive and electrically insulated from each other;

(d) means in association with said core and said drivers for moving said drivers out of said core apertures upon insertion into said keyway of a properly coded key so that said core may be rotated to place said lock in an unlocked position, the portions of said driver moving means associated with said conductive drivers being electrically conductive to form an electrical path through said conductive drivers and said conductive part of said driver moving



means when said conductive portions of said moving means are bridged by an electrical conductor, and

(e) means in association with said core for preventing rotation thereof when said conductive portions of said moving means are bridged by an electrical conductor, ssaid rotation preventing means comprising a cam non-rotatably secured to the end of said core opposite the end of said core into which the key is inserted, a slotted arm in association with said cam having a normal position wherein said arm permits movement of said cam relative thereto and an actuated position wherein said arm engages said cam to prevent movement relative thereto, and solenoid means operable to move said arm from said normal position to said actuated position when said conductive portions of said moving means are bridged by an electrical conductor.

4,186,579

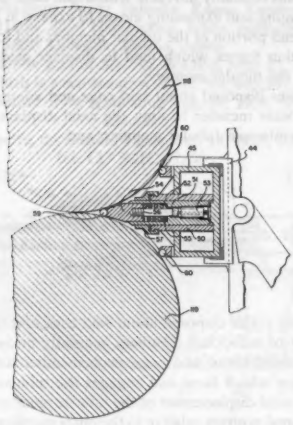
ROLLING MILL GAUGE AND FLATNESS CALIBRATION SYSTEM

Werner W. Elbe, McClandless Township, Allegheny County, Pa., assignor to Blaw-Knox Foundry & Mill Machinery, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 833,262, Sep. 14, 1977, Pat. No. 4,131,004. This application Jun. 7, 1978, Ser. No. 913,308
Int. Cl.[2] B21B *37/08*
U.S. Cl. 72—8 **4 Claims**

1. Apparatus for calibrating the gap between working rolls of a rolling mill stand comprising transducer menas to convert the width of gap into a signal, frame means for mounting said transducer means, said frame means being dimensioned for insertion into the gap between working rolls so as to bring said transducer means against the working rolls and for removal therefrom, said transducer means including a spring-urged feeler tip projecting beyond the frame and transducer means positioned to contact the working rolls near their line of contact but short thereof and movable against said spring away

from said line of contact only, and a pair of support tips, one above and one below the feeler tip positioned to contact the



working rolls at a greater distance from their line of contact than the feeler tip.

4,186,580

APPARATUS FOR THE DISCHARGE OF WASTE ENDS OF BARS IN THE CROSS WEDGE ROLLING PROCESS

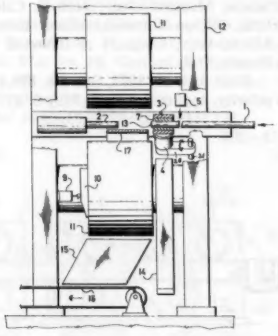
Ján Zalešák, Modrice, and Jan Kovář, Ricmanice, both of Czechoslovakia, assignors to Vyzkumny ustav tvarecich stroju a technologie tvareni, Brno, Czechoslovakia

Filed Sep. 7, 1978, Ser. No. 940,504

Claims priority, application Czechoslovakia, Sep. 8, 1977, 5854-77

Int. Cl.² B21H *9/00*

U.S. Cl. 72—14 **5 Claims**



1. In an apparatus for the step-wise feeding axially of an elongated work piece to a mechanism which works upon it while the work piece is axially at rest between feeding steps, the improvement which comprises a guide for the work piece disposed upstream of the mechanism adjacent thereto, means mounting the guide for swinging between the first position in which the guide is aligned with the path of step wise travel of the work piece and a second, tipped position in which the guide is disposed at a substantial angle respect to such path, and means responsive to a discontinuity in the work piece immediately upstream of the guide for swinging the guide into its second position, whereby the portion of the work piece supported by the guide travels down the guide and is removed from the path of feeding of the work piece.

4,186,581

DRIVE ARRANGEMENT FOR A TOOL CARRIAGE OF A MACHINE TOOL

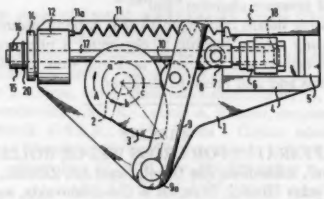
Otto Bihler, Schleiferweg 2, D-8959 Halblech, Füssen, Fed. Rep. of Germany

Filed Aug. 10, 1978, Ser. No. 932,648

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1977, 2741150

Int. Cl.² B21J *7/46*; B21D *55/00*; B21J *9/18*

U.S. Cl. 72—26 **21 Claims**



1. In a tool carriage arrangement for a machine tool including a support, a tool carriage mounted on said support for movement between a working position and a rest position, drive means for moving said carriage in a path from said rest position into said working position and for thereafter permitting return of said carriage to said rest position, and a spring interposed between said carriage and said support in a manner to stress said spring during said moving, whereby the stressed spring biases the carriage to return from said working position to said rest position, the improvement which comprises auxiliary return means for supplementing the biasing force of said spring and for thereby augmenting the force available for returning the carriage toward said rest position at least in a position of said carriage adjacent said working position.

4,186,582

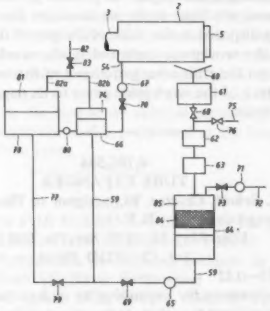
PRESS FOR HYDROSTATIC EXTRUSION OF TUBES AND PROFILES

Tom Johannisson; Kai Nilsson; Rolf Sjöblom, and Marja Widell, all of Vasteras, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Filed Jan. 19, 1978, Ser. No. 870,735

Int. Cl.² B21B *22/10*

U.S. Cl. 72—60 **10 Claims**



1. An apparatus for the hydrostatic extrusion of tubes and profiles of metallic material which comprises

means forming an elongated high-pressure hollow cylinder

forming a pressure chamber therein, said high-pressure cylinder having opposed open ends;

means forming a die having an extrusion hole therein positioned in one of the open ends of said cylinder to sealingly close said open end;

punch means positioned in the other of the open ends of said cylinder and able to move in the elongation direction of said cylinder and thereby generate a pressure within a pressure medium contained in said pressure chamber, which pressurized pressure medium is then able to extrude a billet of metallic material contained in said pressure chamber through said extrusion hole; said pressure medium being prevented from exposure to the atmosphere;

conduit means for supplying pressure medium directly to said pressure chamber, and

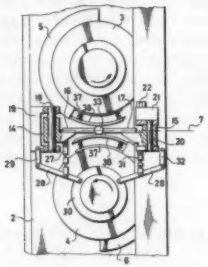
degassing means connected to said conduit means, said degassing means capable of degassing a pressure medium supplied to said degassing tank and thus to said conduit means and said pressure chamber.

4,186,583

APPARATUS FOR CROSS WEDGE ROLLING

Jan Kovář, Ricmanice; Jan Drkal, Brno; Jan Zálešák, Modrice, and Vaclav Hladký, Brno, all of Czechoslovakia, assignors to Vyzkumny ustav tvarecich stroju a technologie tvareni, Brno, Czechoslovakia

Filed May 8, 1978, Ser. No. 903,522
Int. Cl.[2] B21H *1/00*
U.S. Cl. 72—108 **2 Claims**



1. Apparatus for the cross wedge rolling of a workpiece comprising a roll stand with a frame having opposed side members, a pair of opposed working rolls supported between the side members for rotation in the same direction, said working rolls being spaced apart to present a working space between them, working tools mounted on the working rolls, guide bars disposed in the plane of the axis of the workpiece to maintain the workpiece centered in the working space, and segments on the rolls arranged ahead of the working tools to start rotation of the workpiece prior to its engagement by the working tools.

4,186,584

TUBE EXPANDER

Donald E. Schott, Chester, Vt., assignor to Thomas C. Wilson, Inc., Long Island City, N.Y.

Filed May 24, 1978, Ser. No. 909,168
Int. Cl.[2] B21D *39/06*
U.S. Cl. 72—122 **14 Claims**

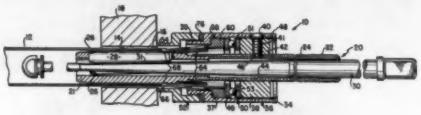
1. An apparatus for expanding an end portion of a tubular member positioned within an opening defined by an outer member, which comprises:

(a) a cage having one end portion adapted for insertion into one end portion of the tubular member;

(b) means mounted on said cage for expanding at least a part of the end portion of the tubular member outwardly into engaged relation with peripheral portions of the opening;

(c) means rotatably movable within said cage for operatively engaging said expanding means to expand at least a part of the end portion of the tubular member and for developing traction forces which tend to displace said cage axially into the tubular member;

(d) means disposed about said cage and adapted to engage the outer member to limit the axial displacement of said cage into said tubular member; and



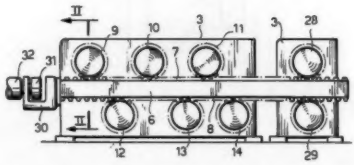
(e) a stop collar disposed about said cage and having a plurality of individual members generally circumferentially positioned about said cage, each member having an end portion which faces and engages the tubular member to limit axial displacement of the tubular member to a predetermined position relative to the outer member and configured and dimensioned to distribute the limiting forces over the end of the tubular member without damaging the tubular member.

4,186,585

DEVICE FOR CONTROLLING THE SPEED OF A MANDREL IN CONTINUOUS RETAINED-MANDREL ROLLING MILLS

Teresio Passoni, Magenta, Italy; Jean P. Calmes, Lausanne, Switzerland; Filippo Cattaneo, Milan, Italy, and Aurindo Nessi, Albate, Italy, assignors to Innocenti Santeustacchio S.p.A., Brescia, Italy

Filed Apr. 20, 1978, Ser. No. 898,118
Claims priority, application Italy, May 5, 1977, 23217 A/77
Int. Cl.[2] B21B *25/02*
U.S. Cl. 72—208 **9 Claims**



1. A device for controlling the speed of a mandrel in a continuous retained-mandrel rolling mill, comprising:

a rod having a double rack provided at one end with a means for removably securing an end of a mandrel;

a plurality of sets of pinions engaging said double rack on the rod; and

each pinion in each of said plurality of sets of pinions being driven in rotation by a corresponding motor-driven shaft operatively connected to a respective clutch, motor and speed-reducing group provided with a brake for each motor-driven shaft.

4,186,586

BILLET AND PROCESS FOR PRODUCING A TUBULAR BODY BY FORCED PLASTIC DEFORMATION

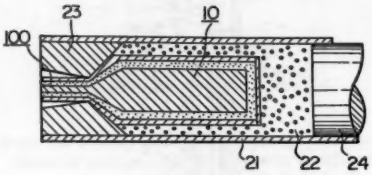
Masayuki Takamura; Norio Shinoda; Kazuo Kurahashi, and Masataka Hatae, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 801,052, May 27, 1977, abandoned, which is a continuation of Ser. No. 645,367, Dec. 30, 1975, abandoned. This application Aug. 31, 1978, Ser. No. 938,424

Claims priority, application Japan, Jul. 18, 1975, 50/87221

Int. Cl.[2] B21C *23/08*

U.S. Cl. 72—264 13 Claims



1. An improved method for producing a tubular body by forced plastic deformation comprising the steps of:

preparing a billet including a metallic tubular sheath, a metallic center core in position within said tubular sheath and an intermediate salt core filling the cylindrical space between said tubular sheath and said center core, the radial thickness t of said sheath being equal to or less than 0.11 times the outer diameter of said sheath;

subjecting said billet to a forced plastic deformation for reducing the diameter of said billet; and

thereafter removing said intermediate core through solution and removing said center core by drawing said center core out of said sheath in order to obtain said tubular body.

4,186,587

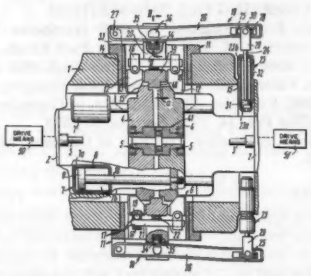
FORGING PRESS

Anatoly S. Grigorenko, ulitsa Tovstukho, 1, kv. 21; Jury A. Moroz, ulitsa Fugenfirova, 11, kv. 91; Leonid I. Kortusov, prospekt Mira, 57a, kv. 10; German N. Kuznetsov, ulitsa Romanenko, 8, kv. 46, and Nina A. Franchenko, ulitsa 4 Severnaya, 126, all of Omsk, U.S.S.R.

Filed Aug. 9, 1978, Ser. No. 932,115

Int. Cl.[2] B21J *13/02*

U.S. Cl. 72—354 3 Claims



1. A press exerting double action upon a workpiece, comprising: a framework; male dies and female die halves; rams carrying said male dies; rams carrying said female die halves and having sloping planes on the sides adjacent to the respective ones of said male dies; said rams carrying said male dies and said rams carrying said female die halves being mounted on said framework for opposing reciprocation; independent drive means for each of said ram; a mechanism adapted to clamp said female die halves together for a stamping operation, comprising wedges mounted for reciprocation on said framework and adapted to cooperate with said rams carrying said female die halves along said sloping planes of said rams carrying said female die halves; rocker arm means interconnecting said wedges adapted to cooperate with different ones of said rams and connecting them with their drive means; spring means urging said rocker arm means with respect of said framework.

4,186,588

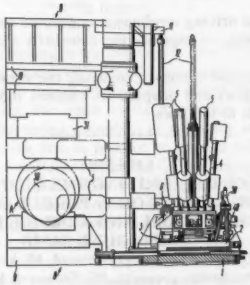
DEVICE FOR FEEDING AUXILIARY TOOLS INTO WORKING ZONE OF PRESS

Sergei N. Gorlitsyn, prospekt Ordzhonikidze, 10, kv. 80; Mikhail R. Kavitsky, ulitsa Bakinskikh komissarov, 58, kv. 164; Vladimir I. Koires, ulitsa Bakinskikh komissarov, 58, kv. 83, all of Sverdlovsk, U.S.S.R.; Leonid A. Efimov, deceased, late of Sverdlovsk, U.S.S.R., and by Iraida I. Gebler, administratrix, ulitsa Khmeleva, 18, kv. 77, Sverdlovsk, U.S.S.R.

Filed Jan. 12, 1978, Ser. No. 868,919

Int. Cl.[2] B23Q *3/00*

U.S. Cl. 72—394 5 Claims



1. A device for feeding an auxiliary tool into a working zone of a press, comprising: a fixed base; a horizontally movable platform mounted on said base; means for horizontally moving said platform; a fixed supporting element located near said platform and oriented relative to the working zone of the press in the direction of tool feed; a plurality of tools; a plurality of tool rods supporting said tools installed on said platform with a provision for moving relative to it; a discrete feed mechanism for moving said tool rods with respect to said platform so that a required tool is brought into the zone of said supporting element; means for moving said platform in a vertical direction, said tool rods being installed on said platform with a provision for turning in a vertical plane around said supporting element so that in the course of vertical movement of said platform the brought-out tool is positioned at the level of the working zone of the press.

4,186,589

APPARATUS FOR FEEDING WORKPIECES IN A MULTI-STATION CROSS-FED PRESS

Roger Criblez, Bottmingen, Switzerland, assignor to Hatebur Umformmaschinen AG, Basel, Switzerland

Filed Apr. 6, 1978, Ser. No. 894,160

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1977, 2715966

Int. Cl.[2] B21D *43/05*

U.S. Cl. 72—405 10 Claims

1. Apparatus for feeding workpieces being acted on in a

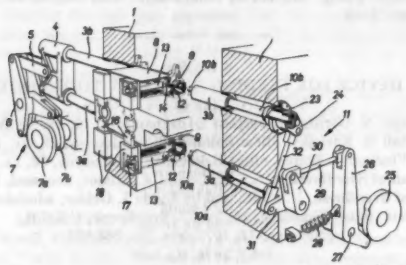
multi-station cross-fed press, said apparatus comprising in combination:

(a) two parallel interconnected hollow carrier elements,

(b) a first driving mechanism connected to the carrier elements and adapted to reciprocally drive the elements in synchronism with the press,

(c) pairs of gripper jaws,

(d) straight guides which are movable with the carrier elements and in which said gripper jaws are arranged to move linearly,



(e) rotatable camshafts which pass through the carrier elements,

(f) a second driving mechanism connected to the camshafts and adapted to oscillate the camshafts about their axes, and

(g) transmission members engaging the camshafts and the gripper jaws and adapted to transmit motion from the camshafts to the jaws.

4,186,590

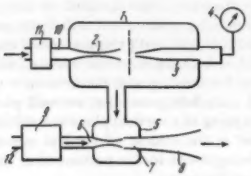
METHOD OF DETERMINING THE QUANTITATIVE CONTENT OF GASEOUS OR VAPOROUS IMPURITY IN A GAS MIXTURE AND A DEVICE FOR ACCOMPLISHING SAME

Alexandr F. Egorov, Shmidtovsky Proezd, 15, kv. 25; Vadim J. Ryzhnev, Ryazansky prospekt, 95, Korpus 4, kv. 20; Dmitry K. Simonovsky, ulitsa Vvedenskogo, 17, korpus 1, kv. 97, and Valery A. Sokolov, ulitsa Malysheva, 4, kv. 30, all of Moscow, U.S.S.R.

Filed May 2, 1978, Ser. No. 902,106

Int. Cl.[2] G01N *7/00*

U.S. Cl. 73—23 **3 Claims**



1. A device for determining the quantitative content of gaseous or vaporous impurity in a gas mixture, comprising: a hollow body of a sensing element; a feed nozzle made in the form of a Laval nozzle and mounted in a wall of said sensing element body; an inlet nozzle arranged coaxially with said feed nozzle and mounted in the opposite wall of said hollow body of a sensing element; a hollow body of an ejector, communicated with the space of said sensing element body; a working nozzle fixed in a wall of said hollow ejector body; a pressure regulator connected to said working nozzle; a body of a mixing chamber, arranged coaxially with said working nozzle and fixed in the opposite wall of said hollow ejector body; a diffuser located on the outside of said hollow ejector body and communicated with said mixing chamber; and a vacuum measuring instrument communicated with said inlet nozzle.

4,186,591

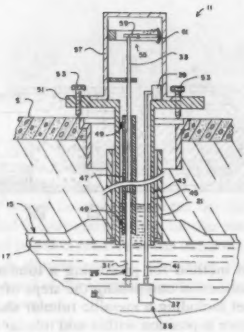
DEVICE FOR AND METHOD OF DETECTING LEAKS IN A LIQUID STORAGE RESERVOIR

Joseph R. Mooney, 33 Hawk St., New Orleans, La. 70124

Filed Nov. 27, 1978, Ser. No. 964,088

Int. Cl.[2] G01M *3/32*

U.S. Cl. 73—49.2 **9 Claims**



1. A method of detecting leaks in an underground liquid storage reservoir of the type including a hollow tank having a top portion located beneath the ground surface, and including one or more hollow tube members extending upwardly above said top portion of said tank and communicating the interior of said tank with said ground surface, the combined cross-sectional area of said tube members being greatly less than the cross-sectional area of the tank, said method comprising:

(a) filling said reservoir with liquid until the level of the liquid rises into said tube members and is above said top portion of said tank and below said ground surface;

(b) measuring any change in the level of the liquid in one of said tube members over a period of time; and

(c) measuring any change in the temperature of the liquid in said reservoir over the same period of time that any change in the level of the liquid in said one of said tube members is measured.

4,186,592

METHOD OF MEASURING THE MOISTURE CONTENT IN FLOWABLE MATERIALS AND APPARATUS FOR CARRYING OUT THE METHOD

Hubert Eirich, Erster Sandweg 16, 6969 Hardheim; Walter Eirich, Spessartweg 18, 6969 Hardheim; Paul Eirich, Bahnhofstrasse 11 6969 Hardheim; Josef Hasenhündl, 6965 Ahorn-Berolzheim, Eubigheimdr-str.840, and Adolf Spengler, Haagstrasse 6, 6987 Kulsheim, all of Fed. Rep. of Germany

Filed Feb. 14, 1978, Ser. No. 877,673

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1977, 2712210

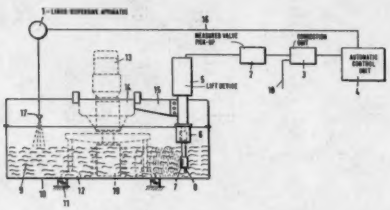
Int. Cl.[2] G01N *33/38*

U.S. Cl. 73—73 **11 Claims**

5. In a mixing apparatus for agitating flowable materials such as casting sand, wet concrete, or chemical mixtures, having a mixing tray in which said flowable material is disposed, a mixing tool disposed in said mixing tray and rotatable relative to said mixing tray for mixing said flowable material to a state of substantially uniform mixture, a moisture measuring probe disposable in said mixture for measuring the moisture content thereof, an automatic liquid dispensing means having a liquid injection nozzle disposed for injecting liquid into said flowable material in said mixing tray, and means associated with said

moisture sensing probe for receiving signal input from said probe and operating said liquid dispensing means to inject liquid into said flowable material to adjust the liquid content of said material to a predetermined value, wherein the improvement comprises:

a cooling and cleaning casing disposed above the surface of said flowable material in said mixing tray, and



means for moving said moisture sensing probe between a retracted position wherein said probe is disposed in said casing and an operative position wherein said probe is disposed in said flowable material in said mixing tray for measuring the moisture content of said material, and

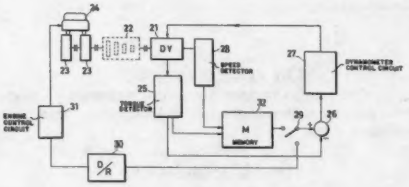
means associated with said casing for cleaning and/or cooling said probe when in said retracted position.

4,186,593

DRIVE SIMULATOR OPERATING METHOD

Youichi Watanabe, Kamakura, Japan, assignor to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Aug. 14, 1978, Ser. No. 933,613
Claims priority, application Japan, Aug. 16, 1977, 52-98091
Int. Cl.[2] G01M *15/00*
U.S. Cl. 73—117 **5 Claims**



1. A drive simulator operating method for permitting a test vehicle to run on the dynamometer system under conditions equivalent to actual vehicle running conditions, the method comprising the steps of

storing in a data recorder on the relationship between vehicle speed and any one of engine throttle opening, intake manifold pressure, and drive dynamometer shaft torque while actually driving the test vehicle on a test course,

storing in a memory data on the relationship between vehicle speed and road load corresponding to the torque absorbed in the dynamometer while driving the test vehicle on the dynamometer system under road load control in accordance with the data stored in the data recorder, and

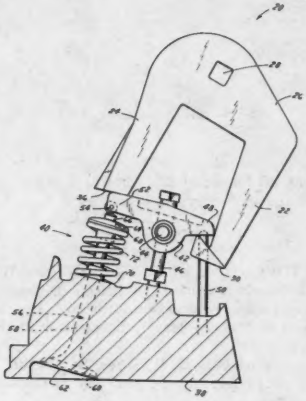
operating the dynamometer under road load control in accordance with the data stored in the memory.

4,186,594

PORTABLE SPRING TESTER

William E. Mitchell, 800 Tanglewood Rd., West Islip, N.Y. 11795

Filed Sep. 28, 1978, Ser. No. 946,505
Int. Cl.[2] G01M *13/00*; G01L *1/04*
U.S. Cl. 73—118 **4 Claims**



1. A portable spring tester adapted for use in testing spring strength for spring assemblies mounted on automobiles and the like comprising; a mounting arm with means thereon for removably locating the tester in fixed position on supporting structures on the spring assembly, an actuating arm extending from the mounting arm in position to engage with the spring assembly and be shiftable to bias the spring, engagement means on the tester for removably mounting a strength indicator thereon so that when the actuating arm is shifted to bias the spring, the strength indicator will provide a reading to indicate the spring strength, the mounting arm and the actuating arm are integrally formed with a central base portion into a U-shaped configuration with each arm forming an opposing leg of the U-shaped tester, the means for removably locating the tester in fixed position on supporting structures being on an edge of the mounting arm distal from an inner section of the central base portion, and the end of the actuating arm distal from the central base portion being substantially axially aligned with the spring to form an engagement surface with the spring assembly which acts in substantially a direct axial direction to bias the spring and thereby facilitate operation of the tester and to facilitate the provision of an accurate reading to indicate spring strength, the means for removably locating the tester in fixed position on supporting structures on the spring assembly including a laterally extending flange on an end of the mounting arm formed by two parallel tangs, and the tangs being positioned to capture a reciprocal rod means on said spring assembly therebetween with the upper surface of the tangs bearing on an adjacent portion of the rod means to thereby removably mount the tester in position on the spring assembly.

4,186,595

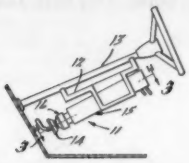
BRAKE TESTING APPARATUS

Erich Domitter, Warren, Mich., assignor to Dominion Tool & Die Company, Inc., Roseville, Mich.

Filed Sep. 8, 1978, Ser. No. 940,822
Int. Cl.[2] G01L *5/28*
U.S. Cl. 73—132 **6 Claims**

1. A testing device for a pedal operated system comprising a supporting housing adapted to be fixed against movement relative to the pedal, a force applying portion supported for movement by said supporting housing into engagement with the pedal, power means within said housing for moving said

force applying portion relative to said supporting portion for applying a force to the pedal, distance sensing means within said housing for sensing the distance of travel of said force



applying portion relative to the supporting housing and force sensing means carried by said force applying portion for sensing the force applied to said pedal.

4,186,596

TORQUE MEASURING ARRANGEMENT

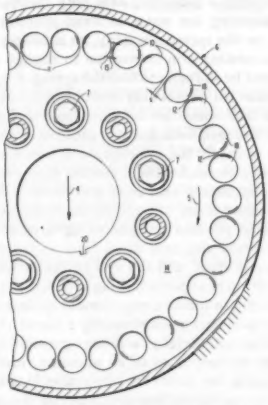
Karl Böhringer, Stuttgart; Peter Reichle, Donaueschingen, and Paul Schwerdt, Freudenstadt, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 22, 1978, Ser. No. 880,107

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1977, 2708484

Int. Cl.² G01L *3/10*

U.S. Cl. 73—136 C **23 Claims**



1. A torque-measuring arrangement with a rotating torque-measuring means adapted to be installed into a force flow of a force transmission, said torque-measuring means having a deformation section which is adapted to be loaded by the torque to be measured and provided with strain gauge strip means adhesively secured thereto, characterized in that the torque-measuring means is essentially disk-shaped and extends substantially perpendicularly to an axis of rotation, a plurality of aperture means of a circular contour are arranged in the torque-measuring means at predetermined radial positions substantially uniformly distributed over a circumference thereof, said aperture means leaving therebetween essentially radially extending spoke-life webs of predetermined position, shape and surface quality, a wall thickness of the torque-measuring means, as measured in an axial direction, is considerably larger at least within an area of the webs than a width of the webs measured in a circumferential direction along a narrowest place thereof, and in that the strain gauge strip means are secured to selected webs so as to form measuring webs.

4,186,597

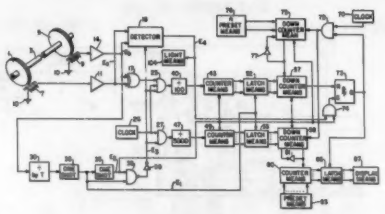
TORQUE METER MEANS WITH REVERSE ROTATION DETECTION

Winthrop K. Brown, Bellaire, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Apr. 28, 1978, Ser. No. 900,964

Int. Cl.² G01L *3/10*

U.S. Cl. 73—136 A **18 Claims**



1. A torque meter for measuring the torque of a rotating shaft comprising at least two sensing means, portions of which are affixed to the shaft, for providing shaft pulse signals at the same frequency but having a phase difference corresponding to the torque experienced by the shaft, first clock means for providing clock pulses, detection means connected to the two sensing means for providing a detection signal corresponding to the direction of rotation of the shaft, circuit means connected to the two sensing means and to said first clock means for providing first groups of pulses in accordance with the shaft pulse signals so that the number of pulses in each group of the first groups of pulses corresponds to the torque experienced by the shaft, first counting means for counting the pulses from the circuit means, pulse means connected to said first clock means for providing second groups of pulses and responsive to the shaft rotation so that a ratio of a group of pulses from said first groups of pulses to a corresponding group of pulses from the second groups of pulses averages out errors due to the shaft rotation; second counting means connected to the pulse means for counting the pulses from the pulse means, control pulse means connected to both counting means for resetting the counting means each revolution of the shaft, and ratio means connected to both counting means and to the detection means for providing an output corresponding to the torque experienced by the shaft in accordance with the ratio of the counts in the counter means and the detection signal.

4,186,598

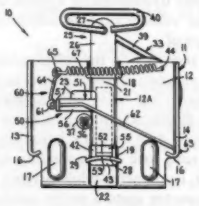
BELT TENSION GAUGE

James A. Okamuro, Oshtemo Township, Kalamazoo County, Mich., assignor to Borroughs Tool & Equipment Corporation, Kalamazoo, Mich.

Filed Aug. 23, 1978, Ser. No. 936,075

Int. Cl.² G01L *5/06*

U.S. Cl. 73—144 **12 Claims**



1. In a gauge for determining the tension on an element, comprising a frame having a pair of spaced coplanar first

element engaging surfaces facing in substantially the same first direction, a first element engaging member supported on said frame for movement substantially parallel with said first direction, said first element engaging member having a second element engaging surface movable into and out of a first terminal position disposed between said first element engaging surfaces and substantially within the plane defined by said first element engaging surfaces, first resilient means urging said first element engaging member in a second direction opposite said first direction, and means supported on said frame for indicating the tension in said element, the improvement comprising:

a second element engaging member slidably supported on said frame for movement independent of said first element engaging member and substantially parallel with said first direction, said second element engaging member having a third element engaging surface facing in said first direction and movable between said first terminal position disposed between said first element engaging surfaces and substantially within said plane defined by said first element engaging surfaces and a second terminal position;

second resilient means urging said second element engaging member in said first direction toward said first terminal position;

wherein said second element engaging surface of said first element engaging member faces in said second direction, and said first resilient means urges said first element engaging member toward said first terminal position;

wherein said indicating means includes means responsive to the movement of said second element engaging member and said third element engaging surface thereon away from said first terminal position in said second direction to said second terminal position, the spacing between said first and second terminal positions being proportional to the tension on said element; and

wherein said frame is defined by a generally U-shaped member having a base wall and a pair of parallel sidewalls disposed along the lateral edges thereof, said base wall having guide means thereon for guiding said first and second element engaging members.

4,186,599

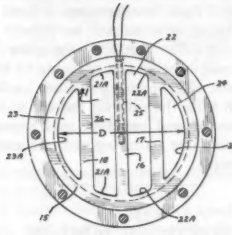
VORTEX SHEDDING FLOWMETER ASSEMBLY

Roger L. Frick, Eden Prairie, Minn., assignor to Rosemount Inc., Eden Prairie, Minn.

Continuation of Ser. No. 755,357, Dec. 29, 1976, abandoned. This application Dec. 27, 1977, Ser. No. 864,828

Int. Cl.[2] G01F *1/32*

U.S. Cl. 73—194 VS **19 Claims**



1. A flowmeter of the vortex shedding type for a fluid flow conduit comprising a plurality of flow obstruction bodies being contoured to cause fluid flow separation and formation of vortices, means to mount said flow obstruction bodies in said conduit in position spaced from each other in a first direction transverse to the flow direction, said flow conduit having a cross section dimension in the first direction of "D", each of said flow obstruction bodies having at least one surface portion generally facing a surface portion of another obstruction body in direction transverse to the flow direction, the spacing of said obstruction bodies being such that vortices formed along one of said facing surface portions affects formation of vortices formed along other of said facing surface portions and reinforces the vortices so formed, and the total width of all flow obstruction bodies in the first direction being not substantially less than 0.2D, and sensor means to sense formation of vortices from at least one flow obstruction body.

4,186,600

MAGNET SYSTEM FOR ELECTROMAGNETIC FLOWMETER

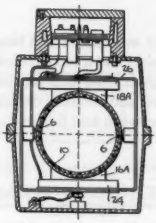
Eggert Appel, Dransfeld; Herbert Gehrke, Rosdorf, and Wilfried Kiene, Hedemunden, all of Fed. Rep. of Germany, assignors to Fischer & Porter Co., Warminster, Pa.

Filed Oct. 3, 1978, Ser. No. 948,222

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1977, 2744865

Int. Cl.[2] G01F *1/58*

U.S. Cl. 73—194 EM **4 Claims**



1. An electromagnetic flowmeter comprising:

A. a flow tube constituted by an outer pipe component formed of a non-magnetizable, weldable metal and an inner liner component protectively lining the pipe formed of electrically insulating material;

B. a pair of electrodes mounted at diametrically-opposed positions on said flow tube; and

C. a magnet system excitable by a low-frequency current source to establish a magnetic field in said flow tube which is intercepted by a fluid to be metered to induce a signal in said electrodes indicative of its flow rate, the system including at least one solid core of ferromagnetic material about which is wound an excitation coil through which said current flows, the frequency of said current being well below the frequency of a standard a-c power line whereby the production of eddy currents in said core is minimized, said core having the shape of a pole shoe whose inner face is welded to the outer surface of said pipe to provide a stable magnetic system, said system being formed by two cores disposed at opposite positions on said pipe and welded thereto at their inner faces, the outer faces of said cores being interconnected by a flux return strap.

4,186,601

MASS FLOW MEASURING APPARATUS

Hiroyuki Maruoka, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Japan

Division of Ser. No. 852,331, Nov. 17, 1977, abandoned. This application Nov. 1, 1978, Ser. No. 956,631

Int. Cl.[2] G01F *1/70*

U.S. Cl. 73—194 F **5 Claims**

1. Apparatus for measuring the mass flow of fluids passing through a conduit comprising:

means for charging a stream of said fluid at a first potential;

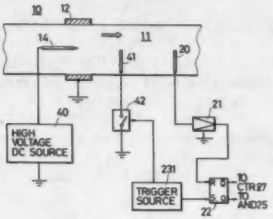
a first electrode disposed downstream of said charging means;

a source of generating trigger pulses at periodic intervals;

a gate-controlled switch for applying a second potential to

said first electrode to discharge a portion of the stream of said charged fluid in response to each of said trigger pulses;

a second electrode disposed downstream of said first electrode to detect each of said discharged portions to generate an output signal;



a bistable device for assuming a first binary state in response to said trigger pulses and a second binary stage in response to the output signals from said second electrode; and

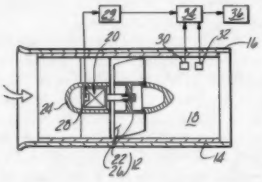
means connected to said bistable device for measuring the lengths of time between said first and second binary states.

4,186,602

HIGH RESPONSE AUTOMOTIVE MASS AIR FLOW SENSOR

Albert Blatter, Southfield, and John Miller, Auburn Heights, both of Mich., assignors to The Bendix Corporation, Southfield, Mich.

Filed Aug. 21, 1978, Ser. No. 935,428
Int. Cl.[2] G01F 1/28
U.S. Cl. 73—228 **32 Claims**



32. A fluid flow sensor for generating a signal corresponding to the rate of fluid flow in a passage, said sensor comprising:

a sensor housing comprising a section of circular tubing adapted to be positioned in said passage to receive the fluid flow therethrough;

a turbine rotor comprised of a hub portion and a plurality of radially extending turbine vanes affixed to said hub portion configured to create an angular momentum change on fluid flowing therethrough;

turbine support means comprised of a plurality of radially extending stator vanes fixed to said sensor housing at a location upstream of said turbine rotor, said support means also including means supporting said turbine rotor on said stator vanes and controlling the angular momentum of said fluid flowing through said turbine rotor;

means sensing the reactive force imposed on said turbine rotor by said change in angular momentum imposed on said flowing fluid by said turbine vanes and generating a signal corresponding thereto;

whereby a signal corresponding to fluid flow rate through said sensor housing is provided;

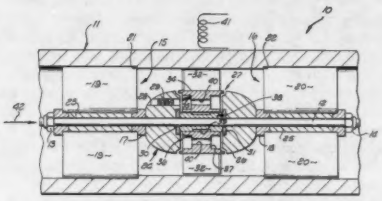
said plurality of stator vanes being located radially intermediate the angular position of said turbine vanes, whereby the effect of turbulence induced by the wake of said stator vanes is minimized.

4,186,603

TURBINE FLOWMETER

Hyung Du Bae, Brea, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Sep. 5, 1978, Ser. No. 939,854
Int. Cl.[2] G01F 1/12
U.S. Cl. 73—231 R **2 Claims**



1. A turbine flowmeter comprising: a hollow housing having an approximately cylindrical internal bore, said bore having an axis; a rotor including a hub and a plurality of fan-like rotor blades fixed thereto in a position extending radially outwardly therefrom; support means fixed relative to said housing inside thereof, said rotor being mounted on said support means and being rotatable relative thereto about said axis and axially slidable thereon; flow control means fixed relative to said support means, said flow control means including a diffuser fixed relative to said support means spaced axially from said rotor on each side thereof, each said diffuser having an external surface which is approximately a surface of revolution concentric with said axis, the diameter of each said diffuser external surface increasing in an axial direction toward said rotor, said flow control means being constructed and positioned to prevent fluid flowing axially inside said bore from reaching said rotor except by flowing over the external surface of one of said diffusers toward said rotor, said hub having an approximately cylindrical external surface, said rotor being hollow and having an impeller fixed therein to increase the pressure on the downstream diffuser inside said hub to keep said rotor spaced from said downstream diffuser when said rotor is turned by flow in said bore against said rotor blades, downstream movement of said rotor away from the upstream diffuser decreasing the space between said rotor and said downstream diffuser for restricting escape of fluid therebetween to limit the ability of said impeller to move downstream, movement of said rotor toward the upstream diffuser reducing the space therebetween, reducing flow to said impeller and reducing its ability to move said rotor upstream, said upstream diffuser having a passageway therethrough from the exterior thereof to the interior of said hub upstream of said impeller, said passageway being L-shaped and having one radial leg and one axial leg in communication therewith.

4,186,604

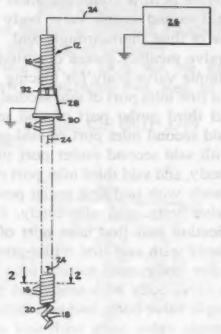
ELECTRONIC DIPSTICK

Alvin J. Mattila, 2 Beaver St., San Francisco, Calif. 94114

Filed Sep. 13, 1978, Ser. No. 941,950
Int. Cl.[2] G01F 23/24, 23/04
U.S. Cl. 73—295 **7 Claims**

1. An improved dipstick for supporting a thermally sensitive electrical element at a prescribed level in a sump defining container comprising an elongate tubular member formed by a plurality of convolutions of helically wound strand, said member having a first end at which the convolutions axially abut one another and a second end remote from said first end at which the convolutions are spaced apart to afford liquid flow therebetween, an axially limited thermally sensitive electrical

element supported interior of said convolutions adjacent said second end, said element being spaced apart from and thermally isolated from said convolutions with said element having direct exposure to liquid flow between said spaced apart convolutions electric circuit forming means including a conductor



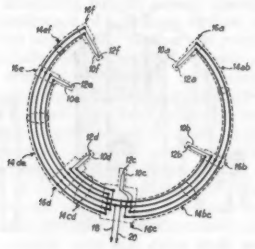
connected to said element and extending interiorly of said convolutions toward said first end, and stop means secured exteriorly of said tubular member adjacent said first end for limiting movement of said second end and said element inward of said sump defining container.

4,186,605

SET OF THERMOCOUPLES FOR MEASURING THE AVERAGE OF SEVERAL TEMPERATURES IN A GIVEN SPACE

Raymond Bourigault, Le Pecq, France, assignor to Materiel et Auxiliaire de Signalisation et de Controle pour l'Automation, Auxitrol, France

Filed Feb. 21, 1978, Ser. No. 879,278
Claims priority, application France, Feb. 25, 1977, 77 05557
Int. Cl.[2] G01K *7/02*
U.S. Cl. 73—341 **5 Claims**



1. A thermocouple arrangement for measuring the average temperature in a region, comprising

a plurality of thermocouples at spaced apart locations within the region, each thermocouple comprising two conductors of different materials,

a plurality of pairs of conductors, one pair allocated to each thermocouple, connecting said thermocouples in parallel to a common junction, the pairs of conductors being of different lengths depending on the distance of their respective thermocouples from the common junction, the material of each conductor of each pair being the same as the material of the thermocouple conductor to which it is connected, and the cross-sectional dimensions of the conductors of each pair being different from the cross-sectional dimensions of the corresponding conductors of other pairs, the cross-sectional dimensions of the conductors of each pair being related to the length of those conductors such that the electrical resistance of each pair of conductors is equal to the electrical resistance of every other pair of conductors and hence the electrical resistance between each thermocouple and the common junction is the same, and

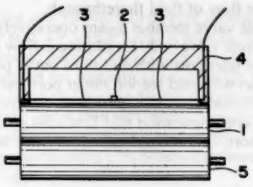
a protective tube between each two successive thermocouples accommodating said pairs of conductors, said tubes being arranged in succession and terminating at a junction box containing said common junction.

4,186,606

APPARATUS FOR MEASURING TEMPERATURE

Noriyoshi Tarumi, Tama; Kenji Ueno, Hachioji, and Hirofumi Sakaguchi, Akigawa, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Apr. 13, 1978, Ser. No. 896,215
Claims priority, application Japan, Apr. 21, 1977, 52-45159
Int. Cl.[2] G01K *1/14*
U.S. Cl. 73—351 **13 Claims**



1. Apparatus for measuring the temperature of a surface of an article comprising:

a thermally responsive temperature measuring element for providing an output signal related to the temperature of said element, an electrical property of said temperature measuring element varying in accordance with the temperature thereof,

and means, comprising a supporting member and conductive elements connected between said supporting member and said temperature measuring element for supporting said temperature sensing element close to said surface so that said temperature measuring element is responsive to the temperature of said surface and for transmitting said output signal from said temperature measuring element, said conductive elements being located close to said surface and exposed to the same temperature as said temperature measuring element whereby no temperature gradient exists between said temperature measuring element and said conductive elements and heat escape from said temperature measuring element to said conductive elements is eliminated.

4,186,607

LIQUID SAMPLE DILUTION SYSTEM

Grady T. Porter; Edward N. Fuller, and Lewis B. Roof, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 6, 1978, Ser. No. 949,288
Int. Cl.[2] G01N *1/10*
U.S. Cl. 73—422 GC **17 Claims**

1. An apparatus for providing diluted samples from a fluid sample source and a fluid diluent source, said apparatus comprising:

first conduit means having first and second ends with the first end thereof in flow communication with said fluid sample source for providing a path for flow of sample fluid therethrough from said fluid sample source;

second conduit means having first and second ends with the first end thereof in flow communication with said fluid

diluent source for providing a path for flow of a diluent fluid stream therethrough from said fluid diluent source;

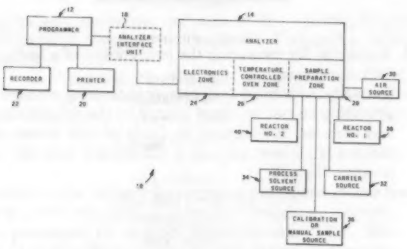
a first sample valve body, having first, second and third inlet ports and first, second and third outlet ports, with the first inlet port thereof in flow communication with the second end of said first conduit means and with the second inlet port thereof in flow communication with the second end of said second conduit means;

third conduit means having first and second ends with the first end thereof in flow communication with the first outlet port of said first sample valve body for providing a path for flow of fluid therethrough;

fourth conduit means having first and second ends with the first end thereof in flow communication with the second outlet port of said first sample valve body for providing a path for flow of fluid therethrough;

fifth conduit means having first and second ends with the first end thereof in flow communication with the third outlet port of said first sample valve body and with the second end thereof in flow communication with the third inlet port of said first sample valve body for providing a path for flow of fluid therethrough;

first sample valve member means operatively related to said first sample valve body for placing in flow communication said first inlet port with said third outlet port, said second inlet port with said second outlet port and said third inlet port with said first outlet port, and, alternately, for placing in flow communication said first inlet port with said first outlet port, said second inlet port with said third outlet port, and said third inlet port with said second outlet port, so as to inject a predetermined quantity of said sample fluid into said diluent fluid stream emanating from the second outlet port of said first sample valve body;



dilution chamber means having an inlet port and an outlet port with the inlet port thereof in flow communication with the second end of said fourth conduit means for mixing said predetermined quantity of said sample fluid with said diluent fluid stream;

sixth conduit means having first and second ends with the first end thereof in flow communication with the outlet port of said dilution chamber means for providing a path for flow of fluid from said dilution chamber means;

a second sample valve body, having first, second and third inlet ports and first, second and third outlet ports, with the first inlet port thereof in flow communication with the second end of said sixth conduit means;

seventh conduit means having first and second ends with the first end thereof in flow communication with a carrier fluid source and with the second end thereof in flow communication with the second inlet port of said second sample valve body for providing a flow path for flow of carrier fluid from said carrier fluid source;

eighth conduit means having first and second ends with the first end thereof in flow communication with the first outlet port of said second sample valve body for providing a flow path for fluid from said second sample valve body;

ninth conduit means having first and second ends with the first end thereof in flow communication with the second outlet port of said second sample valve body for providing a flow path for fluid from said second sample valve body;

tenth conduit means having first and second ends with the first end thereof in flow communication with the third outlet port of said second sample valve body and with the second end thereof in flow communication with the third inlet port of said second sample valve body for providing a path for flow of fluid therethrough; and

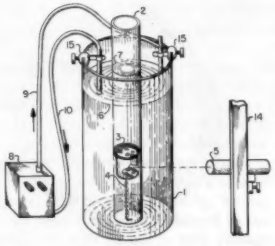
second sample valve member means operatively related to said second sample valve body for placing in fluid communication said first inlet port of said second sample valve body with said third outlet port of said second sample valve body, said second inlet port of said second sample valve body with said second outlet port of said second sample valve body, and said third inlet port of said second sample valve body with said first outlet port of said second sample valve body, and, alternately, for placing in fluid communication said first inlet port of said second sample valve body with said first outlet port of said second sample valve body, said second inlet port of said second sample valve body with said third outlet port of said second sample valve body, and said third inlet port of said second sample valve body with said second outlet port of said second sample valve body, so as to inject a predetermined quantity of said mixed sample fluid and diluent fluid stream emanating from said dilution chamber means into the carrier fluid emanating from said carrier fluid source.

4,186,608

METHOD AND APPARATUS FOR VERIFYING DECLARED CONTENTS OF CONTENTS OF CERTAIN SOLIDS

David J. Stanonis; Walter D. King, both of New Orleans, and Emory E. Coll, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jul. 17, 1978, Ser. No. 925,136
Int. Cl.[2] G01N *9/10*
U.S. Cl. 73—437 **4 Claims**



1. In a density-measuring apparatus of the type which includes a vessel substantially filled with a liquid; a float in said vessel; a variable weight attached to the bottom of said float to hold it submerged in said liquid; and means to measure the vertical repositioning of said float and variable weight, the improvement, a modification comprising:

(a) said liquid in said vessel being of a predetermined and constant density; and

(b) means to secure a solid material of unknown density to said float in addition to said variable weight, and to immerse it in said liquid together with said float, said measuring means thus determining the weight of said solid material in said liquid; wherein said float comprises a hollow chamber whose walls are less dense than said liquid, wherein said walls are perforated to allow said liquid to fill said float when submerged in said liquid; and wherein said walls include access opening means to enable said

material to be placed within said hollow chamber in an untethered state.

4,186,609

EDDY-CURRENT DEVICE FOR MEASURING ROTATIONAL SPEED

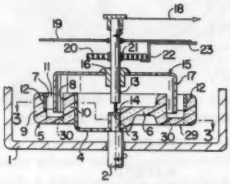
Max Baermann, Bensberg-Wulfshof, Postfach 26, 5060 Bergisch Gladbach 1, Fed. Rep. of Germany

Filed Feb. 27, 1978, Ser. No. 881,779

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1977, 2709412

Int. Cl.[2] G01P *3/49*

U.S. Cl. 73—497 **11 Claims**



1. An eddy-current device for measuring the rotational speed of a rotating drive shaft comprising, annular permanent magnet element means concentric with and mounted on said shaft for rotation therewith, said element means including concentric radially spaced outer and inner ring portions of molded powdered permanent magnetic material bonded by a plastic binder, means mounting said ring portions on said shaft in radially spaced relationship with respect thereto and with respect to one another, said ring portions providing radially spaced circumferentially continuous and uninterrupted outer and inner cylindrical surfaces concentric with said shaft, said outer and inner surfaces providing a circumferentially continuous and uninterrupted axially open air gap concentric with said shaft, said outer cylindrical surface including a first plurality of magnetic poles of alternating polarity equally spaced completely about the circumference of said outer surface, said inner cylindrical surface including a second plurality of magnetic poles of alternating polarity equally spaced completely about the circumference of said inner surface, said first and second pluralities being of like number and providing at least eight sets of radially opposed poles of opposite polarity completely about said circumferentially continuous air gap to provide alternating magnetic fields emanating from said pole sets with their magnetic flux lines traversing said air gap in directions radially of said drive shaft, a thin temperature compensating element on one of said outer and inner cylindrical surfaces of said magnet element means, and an eddy current rotary element of electrically conductive non-magnetic material mounted for rotation relative to said drive shaft, said eddy current element including a circumferentially continuous cylindrical wall coaxial with said drive shaft and projecting axially into said air gap between said outer and inner cylindrical surfaces of said magnet element means to circumferentially continuously intersect said alternating magnetic fields traversing said air gap.

4,186,610

APPARATUS FOR EVALUATING DEFORMATION CHARACTERISTICS OF MECHANICALLY TESTED MATERIALS

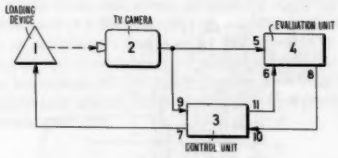
Ladislav Dolezal; Frantisek Weiss; Petr Stanek, and Miroslav Lorenc, all of Brno, Czechoslovakia, assignors to Vyzkumny ustav 070, Brno, Czechoslovakia

Filed Nov. 2, 1978, Ser. No. 956,917

Int. Cl.[2] G01N *3/08*

U.S. Cl. 73—805 **9 Claims**

1. An apparatus for measuring and evaluating deformation characteristics of mechanically deformed test pieces comprising, a loading device for supporting and continuously placing a mechanical load on a test piece to deform said test piece, a TV camera mounted for visually scanning said test piece as it is being deformed, said TV camera having an output producing electrical signals representative of a scanned picture of said test piece, a control unit connected to the output of said TV camera for transforming picture signals into control pulses, a first output of said control unit being connected to said loading device for controlling mechanical load applied to said test



piece, an evaluating unit having a first input thereof connected to the output of said TV camera and a second input thereof connected to a second output of said control unit, said evaluating unit having means for measuring deformation characteristics of said work piece and for producing an output signal at a first output thereof, and a feedback path connecting said first output of said evaluating unit with a second input of said control unit, whereby said control unit produces control pulses for controlling load applied to said test piece.

4,186,611

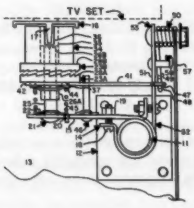
REMOTE CONTROL TV CHANNEL SELECTOR

Robert J. McKnight, 10-5 Jamestowne Village, Toms River, N.J. 08753

Filed Apr. 24, 1978, Ser. No. 899,522

Int. Cl.[2] F16D *41/00*; H03J *1/00*; H01H *17/08*

U.S. Cl. 74—10 A **8 Claims**



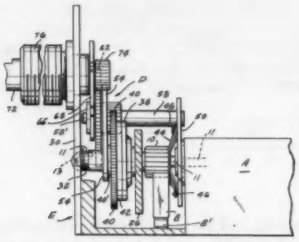
1. An indexing clutch for rotating, in pre-determined arctual increments, a TV channel selector tuner, said clutch consisting of two sleeves rotatably contained on a common shaft fixedly positioned normal to the channel selector dial, coaxially aligned with the center thereof, each sleeve having, on adjacent ends thereof, a plurality of opposed generally wedge-shaped radial teeth which interlock when the driving sleeve is rotated counter-clockwise, the number of teeth on each sleeve being equal to the number of channel positions on the tuner whereby rotating the clutch one ratchet space rotates the tuner one channel space, the driven sleeve being in driving engagement with the tuner.

4,186,612

TUNER DRIVING MECHANISM PERMITTING PLAY IN LOCATION OF INPUT MEMBER

Robert F. Welch, Albuquerque, N. Mex., and Russell D. Stamm, El Paso, Tex., assignors to General Instrument Corporation, Clifton, N.J.

Filed Dec. 19, 1977, Ser. No. 861,857
Int. Cl.[2] F16H 35/18
U.S. Cl. 74—10.8 30 Claims



1. In a tuner comprising an electrical tuning system having a movable control member, a support, means for mounting said tuning system on said support in a given position, a rotatable input member, and an operative driving connection between said control member and said input member; the improvement which comprises first gear means drivingly connected to said control member and mounted on said support to be rotatable about a first and fixed axis, second gear means mounted on said support to be adjustably positionable about the periphery of said first gear means, third gear means mounted to be adjustably positionable about the periphery of said second gear means, means defining a rotatable driving connection from said first gear means through said second gear means to said third gear means, and means operatively connecting said input member and said third gear means for driving connection and fixed relative positioning therebetween, whereby said input member may be located relative to said control member in one of a plurality of positions, said second gear means comprising first and second coaxially mounted and simultaneously rotatable gears, said first gear meshing with said first gear means and said second gear meshing with said third gear means, and means for resiliently urging one of said gear means against the periphery of another of said gear means.

4,186,613

MECHANICAL MOVEMENT

William L. Carlson, Jr., St. Cloud, Minn., assignor to General Signal Corporation, Stamford, Conn.

Filed Nov. 9, 1977, Ser. No. 849,749
Int. Cl. F16h 37/12
U.S. Cl. 74—52 12 Claims

1. A mechanical movement for converting between linear and rotation movement, for operating a device, including:

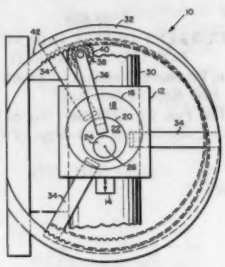
(a) a frame being adapted to move only along a linear path of travel;

(b) a first rotatable member adapted to bear against said frame in such a manner that said first rotatable member is free to rotate with respect to said frame;

(c) a second rotatable member adapted to bear against said first rotatable member in such a manner that said second rotatable member is free to rotate with respect to said first rotatable member in an eccentric fashion; and

(d) a third rotatable member, affixed to said second rotatable member and adapted to rotate therewith, said third rotatable member being adapted to rotate only about a fixed axis; the improvement comprising:

(e) means including a ring gear secured to said first rotary member and a fixed ring gear for positively coupling the rotary members for minimizing sideward thrust on said first and second rotatable members, whereby linear movement of said frame will be converted to rotational movement of said third rotatable member and whereby rotational movement of said third rotatable member will be converted to linear movement of said frame.

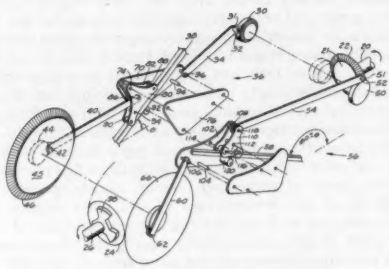


4,186,614

FORCE AND DISTANCE MULTIPLYING OBLIQUE LEVERAGE TRANSMISSION

Fred A. Hamlin, 2957 Henrietta St., La Crescenta, Calif. 91208

Filed Aug. 7, 1978, Ser. No. 931,792
Int. Cl.[2] F16H 21/12
U.S. Cl. 74—63 16 Claims



1. An oblique leverage transmission coupled between a first shaft and a second shaft, comprising:

first gearing means coupled for being rotated by the first shaft, the first gearing means comprising at least a first force transfer gear and a second force transfer gear;

second gearing means comprising at least a third force transfer gear and a fourth force transfer gear, the second shaft coupled for being rotated in response to the rotation of the third force transfer gear and the fourth force transfer gear;

inclined plane means comprising:

a first inclined plane positioned between the first and third force transfer gears, and

a second inclined plane positioned between the second and fourth force transfer gears; and linkage means comprising:

first load transfer means coupled for being moved linearly up and down the first inclined plane in response to the rotation of the first force transfer gear and further coupled to rotate the third force transfer gear as the first load transfer means moves linearly up and down the inclined plane, and

second load transfer means coupled for being moved linearly up and down the second inclined plane in response to the rotation of the second force transfer gear and further coupled for rotating the fourth force transfer gear as the second load transfer means moves linearly up and down the inclined plane.

4,186,615
STEERING GEARS

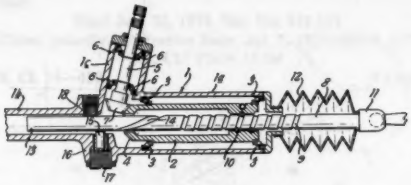
Frederick J. Adams, Clevedon, England, assignor to Cam Gears Limited, Hitchin, England

Filed Aug. 3, 1977, Ser. No. 821,473

Claims priority, application United Kingdom, Aug. 6, 1976, 32901/76

Int. Cl.[2] B62D *3/08*

U.S. Cl. 74—89.15 **14 Claims**



1. A variable ratio steering apparatus for use in turning a steerable vehicle wheel, said apparatus comprising a first drive member having a longitudinally extending central axis, said first drive member having an end portion adapted to be connected with the steerable vehicle wheel, a second drive member, first force transmitting means for transmitting force from said second drive member to said first drive member to effect movement of said first drive member along its longitudinally extending central axis in response to rotation of said second drive member relative to said first drive member to thereby effect turning movement of the steerable vehicle wheel, said first force transmitting means including an external thread convolution formed on said first drive member and an internal thread convolution formed on said second drive member, input means for rotating said second drive member relative to said first drive member in response to rotation of a manually actuatable member, and second force transmitting means for varying the speed of movement of said first drive member along its longitudinally extending central axis during rotation of said second drive member to vary the rate of turning movement of the steerable vehicle wheel, said second force transmitting means including means for varying the speed of relative rotation between said first and second drive members during rotation of said second drive member.

4,186,616
VARIABLE SPEED TRANSMISSION SYSTEMS

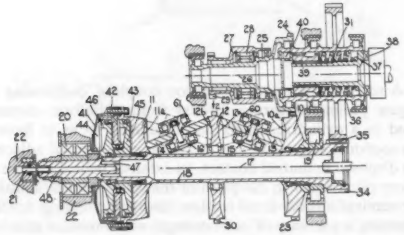
Raymond Sharpe, Mirfield, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Aug. 12, 1977, Ser. No. 824,249

Claims priority, application United Kingdom, Aug. 14, 1976, 33905/76

Int. Cl.[2] F16H *15/08*

U.S. Cl. 74—200 **7 Claims**



1. A transmission system comprising two axially spaced rotatable torous discs rotatable about a common gear axis, part toroidal surfaces on the respective axially presented faces of the discs respectively, an input connected to one of the discs, an output connected to the other of the discs, a set of circumferentially spaced drive rollers in frictional rolling contact with the part toroidal surfaces on said discs respectively, bearing structures in which said rollers are mounted respectively, each of the bearing structures being tiltable through a ratio angle about an axis at right angles to an axis of rotation of each roller to vary the distances from the common gear axis of the discs at which the rollers engage the two toroidal surfaces of the discs respectively, means for moving the roller bearing structures generally tangentially with respect to the common gear axis of the discs, said means adapted for applying a force to said structures in a direction to vary a caster angle which is the angle of inclination of each roller with respect to a plane perpendicular to said common gear axis, and means for accommodating movement of the roller bearing axes relatively to said common gear axis of the discs, in a direction parallel with said common gear axis.

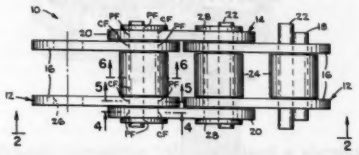
4,186,617
ROCKER JOINT ROLLER CHAIN

Stellios A. Avramidis, Mooresville, and Frederic L. Jones, Indianapolis, both of Ind., assignors to FMC Corporation, San Jose, Calif.

Filed Apr. 6, 1978, Ser. No. 893,919

Int. Cl.[2] F16G *13/06, 15/12*

U.S. Cl. 74—245 S **1 Claim**



1. In an articulated chain comprising a plurality of first links and a plurality of second links, each of said first links and each of said second links having a pair of spaced apart longitudinal sidebars, a pair of transverse pin segments comprising a first pin segment and a second pin segment extending between the opposite ends, respectively, of said sidebars, said first links wider than said second links for an overlapping relationship between said links when said pins are in coupled pivotal engagement, the improvement wherein said sidebars of said second links are spaced apart in the lateral direction to receive the teeth of a sprocket therebetween and said pairs of pin segments are spaced apart longitudinally to receive said teeth therebetween, and wherein each end of each sidebar of said first links has an opening of generally circular configuration with a slightly pinched waist to divide the opening into two portions of unequal size, each end of each first pin segment tightly received in said smaller portion of said opening in each end of each sidebar of said first links to render said first links rigid, each end of each sidebar of said second links having an opening of generally circular configuration with a slightly pinched waist to divide the opening into two portions of unequal size, each end of each second pin segment tightly received in said smaller portion of said opening in each end of each sidebar of said second links to render said second links rigid, said first pin segments received in the larger portion of said openings in the sidebars of said second links with clearance and said second pin segments received in the larger portion of said openings in the sidebars of said first links with clearance, said first pin segments received in said sidebars of said second links in coupled relationship with the second pin segments and said second pin segments received in said sidebars of said first links in coupled relationship with the first pin segments to couple said links together, a convex surface on the inner and outer faces of each of said first pin segments and a convex surface on the inner and outer faces of each of said

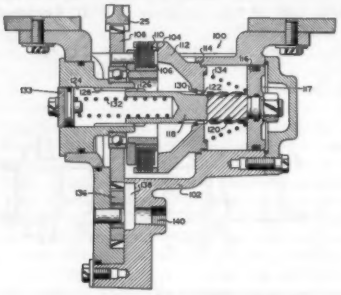
second pin segments for rocking engagement at the joint between each link and adjacent links.

4,186,618

TRANSMISSION INPUT DECELERATING AND REVERSING MECHANISM

Elmer A. Richards, Kalamazoo, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 5, 1977, Ser. No. 822,174
Int. Cl.[2] F16H *3/38*
U.S. Cl. 74—339 **15 Claims**



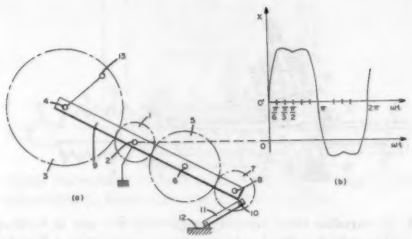
1. A selectively actuatable mechanism adapted to be coupled with a driven shaft, said driven shaft driven by a one-way prime mover through a normally engaged selectively disengageable master clutch and adapted to be selectively engaged to a driven device, said mechanism effective when actuated and when said master clutch is disengaged to decelerate said driven shaft and when said master clutch is disengaged and said driven shaft is disengaged from said driven device or said given device is at rest to decelerate said driven shaft and to then momentarily positively rotate said driven shaft in the direction opposite the direction said driven shaft is rotated by said prime mover said mechanism comprising a housing, a friction coupling rotatable in said housing, one member of said coupling rotationally fixed to a gear adapted to be driven by said driven shaft and the other member of said coupling rotationally fixed to a reaction member, said reaction member axially and rotationally movable in said housing, axial movement of said reaction member toward said one coupling member effective to tend to rotate said reaction member in the rotational direction opposite the direction said one coupling member is normally rotated by said shaft, said reaction member coupled to an actuation shaft by a substantially helical spline, said splined connection permitting relative axial and rotational movement of said reaction member and said actuation shaft, said actuation shaft axially movable but rotationally fixed to said housing, an axial force motor comprising a pneumatic piston for urging said actuation shaft toward said first coupling member, control means for supplying pressurized fluid to said piston, said control means including a timer circuit for limiting the maximum period of time pressurized fluid can be supplied to said piston, a return biasing means for urging said coupling members apart.

4,186,619

WINDING DEVICE

Alex Nissen, Paris, and Distel Charles, Chatillon, both of France, assignors to Videon, S.A., Boulogne-Billancourt, France

Filed Jun. 1, 1978, Ser. No. 905,627
Claims priority, application France, May 13, 1977, 77 14656
Int. Cl.[2] H02K *15/04*
U.S. Cl. 74—414 **10 Claims**



1. Mechanical device for obtaining complex movements, characterized in that it consists of:

a first means of causing the movement from one point whose projection on a given axis is a sinusoidal movement in respect to time at a determined frequency.

a second means causing the movement of the first means in a way such that the projection of the point of movement considered along a given axis is the algebraic sum of a sinusoidal movement in respect to time at a determined frequency and of a sinusoidal movement in respect to time at a frequency three times that of the previous determined frequency,

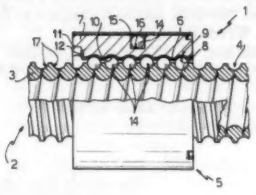
and the receptor means of the movement obtained.

4,186,620

SCREW-NUT SCREW TRANSMISSION COUPLING

Enzo Brusasco, Turin, Italy, assignor to Roltra S.p.A., Milan, Italy

Filed Feb. 24, 1978, Ser. No. 880,917
Claims priority, application Italy, Mar. 9, 1977, 67516 A/77
Int. Cl.[2] F16H *1/18*
U.S. Cl. 74—424.8 R **7 Claims**



1. A screw-nut screw transmission coupling, comprising an elongate preloaded spring formed from a filiform element wound as a cylindrical helix and machined so as to have a cross-sectional shape defining, between each pair of adjacent turns disposed in mutual contact, an external helical groove of uniform pitch equal to the pitch of the spring and of substantially semicylindrical cross-section, and the coupling further comprising a plurality of ball bearings, and a tubular member through which said elongated member extends with radial slack, said tubular member comprising first and second tubular sleeves which are rigidly connected in coaxial arrangement with the first sleeve disposed within the second sleeve, said first sleeve being formed with an internal helical groove of

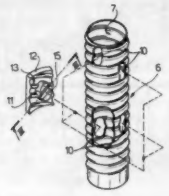
pitch substantially equal to the pitch of said external helical groove, said internal helical groove cooperating with said external helical groove to define a first duct, and said second sleeve being formed with a return duct which communicates with said first duct.

4,186,621

SCREW-NUT SCREW TRANSMISSION COUPLING

Enzo Brusasco, Turin, Italy, assignor to Roltra S.p.A., Turin, Italy

Filed Jun. 22, 1978, Ser. No. 918,111
Claims priority, application Italy, Jul. 7, 1977, 68574 A/77
Int. Cl.[2] F16N *55/04*
U.S. Cl. 74—459 **5 Claims**



1. A screw-nut screw transmission coupling comprising a tubular outer member and an elongate inner member having complementary helical grooves cooperating to define a helical ball bearing duct; a plurality of return ducts extending between corresponding points of respective pairs of adjacent turns of said helical ball bearing duct to define therewith a plurality of endless ball bearing ducts; and a plurality of ball bearings arranged in mutual engagement within each said endless duct;

said tubular outer member comprising a tubular sleeve provided internally with one of said helical grooves and with a plurality of radial through bores, each said bore straddling a respective pair of adjacent turns of said internal helical groove and having a diameter substantially equal to the width of said pair of turns, and a plurality of plates coupled to the outer surface of said sleeve and each arranged to close a respective one of said through bores; each said return duct being in the form of a cavity provided in each said plate.

4,186,622

REDUNDANT FLIGHT CONTROL SYSTEM

Dean E. Cooper, Trumbull, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Oct. 27, 1977, Ser. No. 846,093
Int. Cl.[2] B64C *13/04*; F16C *1/10*
U.S. Cl. 74—501 R **8 Claims**

1. A flight control system including:

(A) a quadrant member mounted for clockwise and counterclockwise motion about an axis of rotation and including a left arm member and a right arm member extending on opposite sides of the axis of rotation

(B) output means responsive to quadrant rotation,

(C) a first flexible cable member connected to the quadrant right arm to cause clockwise rotation thereof,

(D) a second flexible cable member connected to the quadrant left arm to cause counterclockwise rotation thereof,

(E) means to actuate said cable members, and

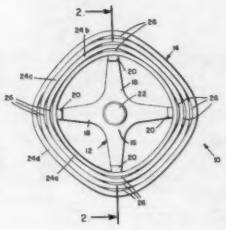
(F) a first preloaded spring member connecting said first cable member to said quadrant member and a second preloaded spring member connecting said second cable member to said quadrant member so that if either of said cable members is severed, said spring members will cause said quadrant member to rotate in the same direction that the severed cable caused the quadrant member to rotate when operative.

4,186,623

MULTI-RIM FLYWHEEL ATTACHMENT

Johan A. Friedericy, Palos Verdes Estates; Dale O. Moeller, Rolling Hills, and Dennis A. Towgood, Huntington Beach, all of Calif., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Apr. 3, 1978, Ser. No. 892,587
Int. Cl.[2] F16F *15/30*; F16C *15/00*; H02K *7/02*
U.S. Cl. 74—572 **14 Claims**



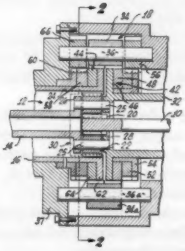
5. A flywheel comprising hub means, and a plurality of nested rims positioned on said hub means, said rims having a non-circular configuration with a plurality of enlarged points when said flywheel is at rest and having a substantially circular configuration when said flywheel is spinning at a preselected speed, a plurality of spacer means being positioned between adjacent pairs of rims in radial alignment at each of said enlarged points for increasing non-circularity of the rim outside each of said spacer means.

4,186,624

SEQUENTIAL DRIVE MECHANISM

Donald J. Fessett, Industry, Calif., assignor to Western Gear Corporation, Lynwood, Calif.

Filed Apr. 11, 1977, Ser. No. 786,085
Int. Cl.[2] F16H *37/00*, *37/06*, *3/74*
U.S. Cl. 74—679 **36 Claims**



1. A drive mechanism comprising:

an input shaft;

first and second output shafts;

transmission means for alternatively transmitting power from said input shaft to either of said output shafts;

a plurality of rotatable cams;

cam-drive means for driving said cams at different rotational speeds in response to the rotation of at least one of said shafts; and

stop means for arresting rotation of said first output shaft when said cams have a first predetermined relationship and for arresting rotation of said second output shaft when said cams have a second predetermined relationship.

4,186,625

REVERSIBLE TRANSMISSION

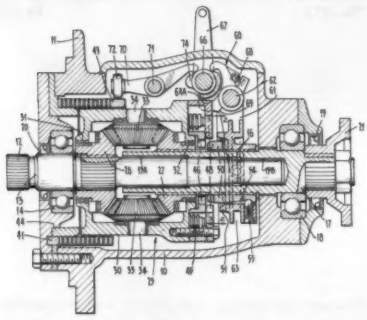
Alan H. Chamberlain, 95 Dow St., Port Melbourne, Victoria, Australia (3207)

Filed Jun. 20, 1977, Ser. No. 808,306

Claims priority, application Australia, Jun. 21, 1976, 6344

Int. Cl.[2] F16H *3/44*

U.S. Cl. 74—780 **1 Claim**



1. A reversible transmission comprising:

a housing;

an input shaft and an output shaft journalled co-axially in the housing;

a planetary gear system including an input gear coupled to the input shaft, an output gear coupled to the output shaft, planetary gears coupling said input and output gears, and a planetary gear carrier rotatably supported co-axially with the shafts and carrying the planetary gears;

brake means operable for selectively locking the carrier against rotation which provides reverse drive and releasable coupling means for selectively drive-coupling the carrier to the output shaft which provides forward drive;

said releasable coupling means including;

first clutch means for coupling the carrier to the output shaft and including a friction drive, and

second clutch means for mechanically coupling the carrier to the output shaft;

actuating means operable for initially engaging the first clutch means and thereafter engaging the second clutch means while maintaining the first clutch means engaged;

said first clutch means comprising:

a dog clutch having a driven toothed member mounted co-axially on the output shaft to rotate therewith and

a drive toothed member coupled to the carrier by a constantly engaged multi-plate friction clutch;

said second clutch means comprising:

two toothed dog clutch elements, one secured directly to the carrier and the other mounted co-axially on the output shaft to rotate therewith;

said driven toothed member and said other toothed dog clutch element being axially slidable together on the output shaft to engage the first clutch means; and

said other toothed dog clutch element being axially slidable on said driven toothed member to engage the second clutch means.

4,186,626

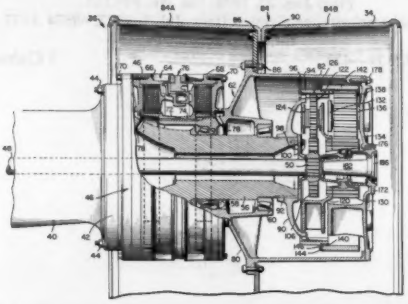
WHEEL FINAL DRIVE ASSEMBLY

Richard W. Chamberlain, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 21, 1978, Ser. No. 879,304

Int. Cl.[2] F16H *1/28, 35/00, 57/00;* **B60K** *23/00*

U.S. Cl. 74—801 **24 Claims**



1. A wheel final drive assembly for vehicles, wherein the assembly includes a double reduction planetary gearing mechanism positioned within and drivingly connected to a wheel hub of a vehicle drive wheel, a drive axle shaft interconnecting a vehicle power train differential and the gearing mechanism, a separable part hollow hub having positioning faces contacting and axially positioning gears of the gearing mechanism, a hollow spacer plug removably insertable through the hollow hub and having a face contactable with the outer end of the axle shaft to operatively position the axle shaft in driving connection between said differential and gearing mechanism, removal of the spacer plug permitting selective movement of the axle shaft through the hollow hub to an inoperative position in the assembly for partial stowing therewithin, and for complete removal therefrom.

4,186,627

OIL PRESSURE CONTROL MEANS FOR AN AUTOMATIC TRANSMISSION

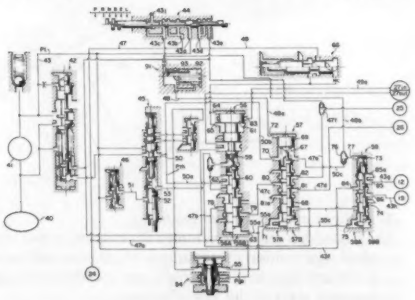
Koujiro Kuramochi, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Mar. 15, 1978, Ser. No. 886,960

Claims priority, application Japan, Apr. 22, 1977, 52-47240

Int. Cl.[2] B60K *41/18*

U.S. Cl. 74—869 **6 Claims**



1. An oil pressure control means for an automatic transmission which comprises a fluid torque converter and a speed shift

gear means having a plurality of friction engaging means and adapted to establish various speed stages, said oil pressure control means comprising a source of oil pressure, a line pressure regulating valve which generates a line pressure from the oil pressure of said source, a throttle pressure regulating valve which generates throttle pressure corresponding to engine throttle opening, a governor valve which generates governor pressure corresponding to vehicle speed, a manual shift valve having a plurality of output ports which selectively deliver output oil pressure for shifting speed ranges, a plurality of speed shift valves which change over supply of oil pressure to said friction engaging means depending upon a balance of said throttle pressure and said governor pressure, first and second passage means for supplying oil pressure delivered from one of said output ports of said manual shift valve to first and second valves of said speed shift valves, respectively, as a control oil pressure for shifting down these valves, said first and second valves causing changing over between the highest speed stage and the next lower speed stage and between said next lower speed stage and the next but one lower speed stage, respectively, and a downshift control valve provided at a middle portion of said second passage means for selectively intercepting the passage therethrough in a manner such that the supply of oil pressure through said second passage is definitely delayed relative to the supply of oil pressure through said first passage so that abrupt two-stage downshifting from the highest speed stage to the next but one lower speed stage is prohibited.

4,186,628

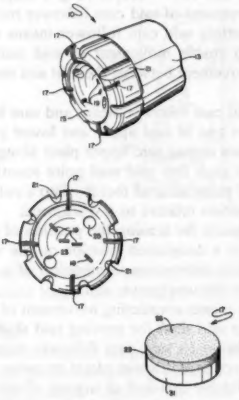
ROTARY DRILL BIT AND METHOD FOR MAKING SAME

Phillip E. Bonnice, Worthington, Ohio, assignor to General Electric Company, Worthington, Ohio

Division of Ser. No. 746,044, Nov. 30, 1976, Pat. No. 4,098,362. This application Mar. 20, 1978, Ser. No. 888,259

Int. Cl.[2] B21K *5/02*

U.S. Cl. 76—108 A **6 Claims**



1. A method for making a diamond compact drill bit comprising the steps:

(a) mounting a plurality of cutting elements, each comprised of a diamond compact, in a mold;

(b) filling a drill crown portion of the mold surrounding said elements with a metal powder;

(c) inserting a drill shaft into said mold;

(d) filling said portion of said mold surrounding said elements with a molten solder having a flow point of less than 700° C.;

(e) allowing said solder to solidify; and

(f) removing the drill bit so formed from the mold.

4,186,629

DEVICE FOR UNTIGHTENING AND TIGHTENING NUTS

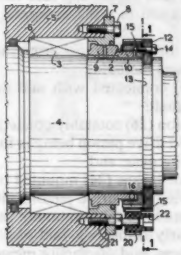
Claude Costes, Dunkerque, France, assignor to Union Siderurgique de Nord et du l'est de la France, France

Filed Nov. 23, 1977, Ser. No. 854,196

Claims priority, application France, Nov. 25, 1976, 76 35564

Int. Cl.[2] B25B *13/00*

U.S. Cl. 81—53 R **4 Claims**



1. A device for untightening and tightening a nut for regulating the chock rolling bearings of rolling mill rolls, comprising:

a shaft of a rolling mill roll;

an annular member mounted on said shaft having an outer surface, a portion of which outer surface is threaded;

a nut having an outer surface and a threaded inner surface, which nut is screwed onto the threaded portion of said annular member;

a collar axially adjacent to said nut which collar is mounted on said shaft and releasably connected to said nut;

a ring gear including a gear member which is separate from said nut but mounted on the outer surface of the nut;

means fixing said gear member on the nut; and

a gear pinion in mesh with the ring gear and rotatably mounted on a fixed pin, the gear pinion having first means for receiving second means for driving the pinion in rotation.

4,186,630

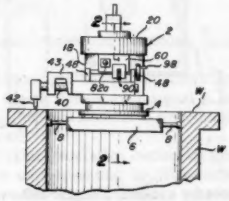
FACING AND JOURNAL TURNING MACHINE

Carl L. Lindhag, International Falls, Minn., assignor to Boise Cascade Corporation, Boise, Id.

Filed Apr. 4, 1978, Ser. No. 893,429

Int. Cl.[2] B23B *3/26*

U.S. Cl. 82—4 C **3 Claims**



1. Portable turning apparatus for machining an end surface of a generally cylindrical workpiece, comprising

(a) a stationary base plate (6) adapted for connection within an end portion of the workpiece, said base plate extending generally normal to the longitudinal axis of said workpiece;

(b) a stationary shaft (14) connected at one end with said base plate, said shaft being adapted to extend at its other

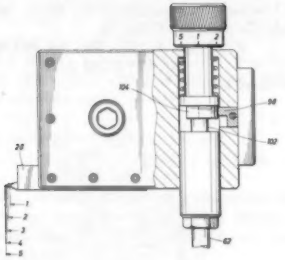
end from said workpiece in coaxial relation to the longitudinal axis thereof;
(c) a hollow cylindrical drum (2) journalled for rotation concentrically about said shaft, said drum being so supported on said shaft that it is closed at one end by said base plate;
(d) a stationary cover member (20) connected with said other end of said shaft for completely enclosing the other end of said drum;
(e) tool holder means (40) carrying a cutting tool (42);
(f) guide means (36) supporting said tool holder means for axial reciprocation in a plane normal to the axis of said drum;
(g) drive means for rotating said drum shaft about said shaft, said drive means including
(1) a ring (30) connected with said drum concentrically about said shaft;
(2) a drive pinion (26) rotatably connected with said cover member, said drive pinion being in meshing engagement with said ring gear; and
(3) drive motor means (24) mounted on said cover member for driving said drive pinion; and
(h) means responsive to the rotation of said drum about said shaft for linearly displacing said tool holder relative to said guide means, said displacing means including
(1) a stationary conical drive gear (54) concentrically mounted on and secured to said shaft;
(2) a conical driven pinion gear (56) rotatably connected with said drum and extending normal to the axis thereof, said driven pinion being in meshing engagement with said conical drive gear;
(3) a worm gear (52) rotatably connected with said drum;
(4) means (70) connecting said worm gear with said conical driven pinion gear; and
(5) means (50) driven by said worm gear for linearly displacing said tool holder relative to said drive means, whereby during rotation of said hollow drum about said shaft, the cutting tool is progressively radially displaced to machine the entire end face of said workpiece.

4,186,631

THREADING APPARATUS FOR A STANDARD ENGINE LATHE

James D. Grider, 3902 Galway, Houston, Tex. 77080

Filed Feb. 24, 1978, Ser. No. 881,021
Int. Cl.[2] B23B 1/00
U.S. Cl. 82—5 **10 Claims**



1. An attachment for a standard engine lathe which lathe has
(a) a head stock for rotating a workpiece
(b) above a set of parallel ways
(c) which support a traveling carriage for movement along the ways,
(d) a lead screw parallel to the ways
(e) for driving a traveling nut connected to the traveling carriage to move the traveling carriage along the ways,
(f) a cross feed on the traveling carriage, the attachment comprising:
(1) an attachment housing demountably positioned above the traveling carriage for movement along the cross feed toward and away from the locus of a workpiece supported by the head stock;
(2) said attachment housing comprising:
(i) a lower plate;
(ii) an upper plate;
(iii) abutting faces on said plates contacting one another to enable sliding movement;
(iv) means for relatively fixing said lower plate to the traveling carriage;
(v) a slidable dovetail between said plates enabling movement in a direction and further constraining movement in a direction perpendicular to the direction in which movement is permitted;
(3) tool point securing means carried by said upper plate for securing a tool point to cut a workpiece;
(4) a resilient means coacting between said upper plate and lower plate for urging said upper plate in movement along said slidable dovetail;
(5) wherein said dovetail is oriented on the traveling carriage to retract a tool point carried by said tool point securing means away from a workpiece;
(6) said resilient means imparting movement to said upper plate of at least a specified distance sufficient to retract the tool point from the workpiece;
(7) a shaft supported in a chamber formed in said upper plate, said shaft movable along its length between first and second positions;
(8) a cam operatively supported by said shaft which cam has first and second relative locations which differ from one another;
(9) cam follower means cooperatively engaged with said cam which cam follower means moves from said first to said second locations;
(10) means for rotating said shaft to rotate said cam supported thereby between altered relative positions to said cam follower means;
(11) said shaft and cam incorporating a shaped portion enabling movement of said cam follower means in setting and resetting said cam follower means relative to said shaft to enable movement of said cam follower means for movement between the first and second locations;
(12) each of said cam follower means and cam being fixed in position to one of said upper and lower plates, said resilient means urging said upper plate along said slidable dovetail such that said tool point securing means moves a tool point secured thereby into a cutting and a retracted position relative to a workpiece;
(13) movable means for sensing the position of said housing relative to a designated location on the workpiece which location determines termination of a multipass cut thread on the workpiece; and
(14) connective means connecting movement of said movable means to said shaft for moving said shaft to move said cam relative to said cam follower means which enables said upper and lower plates to move relatively along said slidable dovetail at urging of said resilient means and wherein said resilient means is released for operation only after operation of said sensing means.

4,186,632

CUTTING SYSTEM FOR SLAB-TYPE MATERIALS

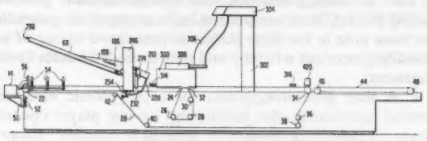
Elmer N. Leslie; Bobby Higgins, both of Dallas, and Joe T. Huff, Garland, all of Tex., assignors to Camsco, Inc., Richardson, Tex.

Filed Jul. 7, 1978, Ser. No. 922,703
Int. Cl.[2] B26D 5/00
U.S. Cl. 83—13 **18 Claims**

1. A method of cutting component parts from a slab comprising the steps of:

placing at least a first slab in a first measurement device and measuring the dimensions of said first slab;

transmitting the dimensions to a marker-making device for generating a marker;



transporting at least said first slab from said first measurement device to a first cutting device while generating the marker in the time interval of transportation; and

cutting at least said first slab in said first cutting device using the generated marker to define the patterns to be cut in said slab.

4,186,633

APPARATUS FOR DISPENSING SHEETS OF WEB MATERIAL OF PREDETERMINED LENGTH

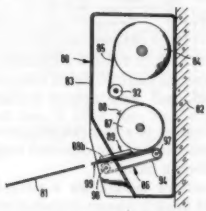
Manfred Baumann, and Walter Besserer, both of Diepoldsau, Switzerland, assignors to Apura GmbH, Mainz-Kostheim, Fed. Rep. of Germany

Filed Apr. 18, 1978, Ser. No. 897,453

Claims priority, application Switzerland, Apr. 19, 1977, 004859/77

Int. Cl.² B65H *35/08*

U.S. Cl. 83—155 **16 Claims**



1. An apparatus for dispensing sheets of web material of predetermined length from a supply of the web material comprising:

a housing;

means for storing the supply of web material in the housing,

separating means comprising a bladed roller having thereon a blade having a width at least equal to the width of the web material arranged in the housing and operable in response to a user of the apparatus pulling from the housing the free end of web material in the storing means, to separate a sheet of the web material from the remainder and to leave at least a portion of the leading edge of the remainder of the web available to be gripped by a subsequent user,

conveying means arranged to engage the web over a part of its width,

non-positive drive means operable between the bladed roller and the conveying means, and

a pressure device arranged to urge the web into engagement with the conveyor means.

4,186,634

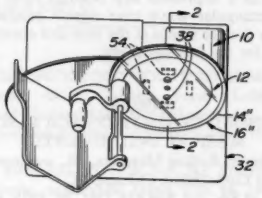
SLICING MACHINE CLEANING GUARD

Joseph Akczinski, Sr., 317 Shipley Ave., Glen Burnie, Md. 21061

Filed Sep. 27, 1978, Ser. No. 946,315

Int. Cl.² B26D *7/22*

U.S. Cl. 83—478 **10 Claims**



1. A slicing machine cleaning guard to aid a user in cleaning the rear surfaces of a rotary slicing blade having a substantially planar frontal cutting surface, said rotary slicing blade adapted for rotary displacement with respect to a housing of said slicing machine, wherein the improvement comprises:

(a) a rotary blade cover element mounted to said slicing blade frontal cutting surface in contiguous interface throughout said frontal surface, said cover element extending beyond a cutting edge of said slicing blade throughout an entire circumference of said cutting blade; and,

(b) means for securing said rotary blade cover element to said housing of said slicing machine.

4,186,635

ELECTRONIC MUSICAL INSTRUMENT

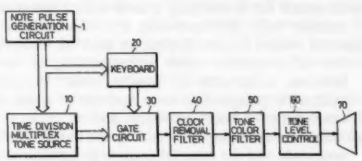
Eiichiro Aoki, and Akira Nakada, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jul. 1, 1977, Ser. No. 812,377

Claims priority, application Japan, Jul. 9, 1976, 51/81516

Int. Cl.² G10H *1/00, 5/00*

U.S. Cl. 84—1.01 **3 Claims**



1. A polyphonic keyboard electronic musical instrument comprising:

a timing generator providing a repetitive set of time division multiplex timing signals, each signal in said set occurring at a unique time slot allotted to a particular corresponding musical note;

a numerical value generation circuit for generating numerical values corresponding to frequencies of respective notes on a time shared basis in synchronism with the multiplex timing signals for each corresponding note;

an adder circuit for implementing the cumulative addition of said numerical values for each of the notes at each time slot allotted to said note in synchronism with the multiplex timing signals for each such note and producing carry signals as results of the respective cumulative additions, the carry signals for each note also occurring in the time slot allotted to that note, the envelopes of the carry signals for each note constituting rectangular wave tone signals having frequencies established by the respective added

numerical values and being multiples of the corresponding musical note frequencies;

frequency dividing means for producing rectangular tone wave signals in a plurality of octaves for each of said notes on a time shared basis by frequency dividing the carry signals, and

a tone selection circuit for selecting by gating to an output the rectangular wave tone signal in the octave to which the note of a depressed key belongs from among said plural rectangular wave tone signals produced by said frequency divider means at the time slot corresponding to said note for the depressed key.

4,186,636

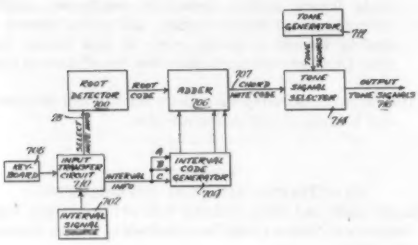
DIGITAL CHORD GENERATION FOR ELECTRONIC MUSICAL INSTRUMENTS

Patrick S. Roberts, Rolling Meadows, Ill., assignor to Thomas International Corporation, Chicago, Ill.

Continuation of Ser. No. 624,416, Oct. 21, 1975, abandoned, which is a continuation-in-part of Ser. No. 603,859, Aug. 11, 1975, Pat. No. 4,046,047. This application Sep. 19, 1977, Ser. No. 834,686

Int. Cl.[2] G10H *1/00*

U.S. Cl. 84—1.01 **21 Claims**



1. In an electrical musical instrument having means for generating tone signals corresponding to note codes applied thereto, the improvement comprising:

note means for developing a note code representative of a number value corresponding to a selected note;

interval means for developing an interval code representative of a number value corresponding to the distance between notes with the number value increasing as an arithmetic progression over a range of notes as the distance between notes increases; and

an adder for arithmetically adding the number values of the note code and the interval code to generate a new number value corresponding to a new note code for a new note which is spaced from the selected note by the distance between the notes.

4,186,637

TONE GENERATING SYSTEM FOR ELECTRONIC MUSICAL INSTRUMENT

Richard S. Swain, Des Plaines, and Douglas R. Moore, Vernon Hills, both of Ill., assignors to Norlin Industries, Inc., Lincolnwood, Ill.

Filed Sep. 22, 1977, Ser. No. 835,832

Int. Cl.[2] G10H *1/00, 1/02, 5/06*

U.S. Cl. 84—1.01 **21 Claims**

1. A tone generator system for a polyphonic electronic musical instrument, comprising note selection means, a plurality of primary programmable tone generators each assignable to play any of the notes within a selected musical range, said plurality being equal to a selected maximum number of notes within said range which may need to be played, said generators including priority assignment logic responsive to said note selection means and arranged to assign the selected notes to respective ones of said generators, said logic being further arranged to preclude the assignment of any note in any octave to more than one of said primary tone generators, and at least one special function programmable tone generator in addition to said primary generators, said special function generator having priority note assignment logic arranged to assign to it the same note in the same octave as is assigned to one of said primary generators whereby said note is singled out for special treatment.

4. A tone generator system for a polyphonic electronic musical instrument, the instrument having player-operated means for indicating the note or notes to be sounded, comprising:

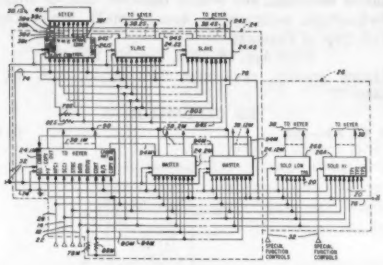
a plurality of storage means, each adapted to store a coded representation of a single note to be sounded;

means responsive to an indication that a note is to be sounded for storing a coded representation of the note in a selected one of said storage means;

a source of high frequency clock signal;

a separate programmable frequency divider for each of said storage means, each of said dividers being adapted to receive the clock signal and to divide the frequency of said signal by a factor which is a function of the code stored in the corresponding storage means to produce an output signal at the frequency of the note having its code stored in said storage means;

means for detecting the storage of a note having a predetermined musical scale relationship to the other notes to be sounded;



and means responsive to said detecting means for storing a coded representation of the detected note in a particular one of said storage means.

17. A tone generator system for a polyphonic electronic musical instrument having player-operated means for indicating the note or notes to be sounded, comprising:

a plurality of storage means, each adapted to store a coded representation of a single note to be sounded;

means responsive to an indication that a note is to be sounded for storing a coded representation of the note, including both note and octave or fractional octave information in a selected one of said storage means;

a source of a high frequency clock signal;

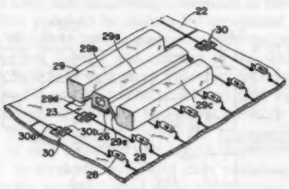
a separate programmable frequency divider for each of said storage means, each of said dividers being adapted to receive the same undivided clock signal and to divide the frequency of said signal by a factor which is a function of the code stored in the corresponding storage means to produce an output signal at the frequency of the note having its code stored in said storage means;

and means for selectively causing pulses to be added to or dropped from the pulses coming from said high frequency clock signal source and applied to at least selected ones of said programmable dividers, including means responsive to the octave or fractional octave information in the corresponding storage means for modifying the rate at which clock pulses will be added or dropped as a function of the octave or fraction of an octave in which said note occurs.

4,186,638
KEYBOARD DEVICE FOR AN ELECTRONIC MUSICAL INSTRUMENT

Masakatu Iijima, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jun. 8, 1978, Ser. No. 913,840
Claims priority, application Japan, Jun. 16, 1977, 52-78790[U]
Int. Cl.[2] G01H *1/00*
U.S. Cl. 84—1.01 **6 Claims**

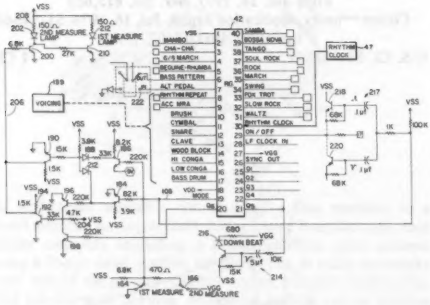


1. A keyboard device for an electronic musical instrument, comprising:
a set of keys,
a corresponding set of switches each associated with a respective key, each switch having a stationary contact,
a movable contact that is common to a plurality of keys corresponding to the notes of one octave, depression of any one or more keys in said one octave causing a corresponding portion or portions of said common movable contact to complete an electrical circuit with the corresponding one or more stationary switch contacts, and
note scanning circuitry for providing signals in time sequential order to said stationary switch contacts, so that upon depression of one or more of said plurality of keys, signals in time slots corresponding to the respective note names of the depressed keys are outputted through said common movable contact.

4,186,639
RHYTHM GENERATOR FOR ELECTRONIC ORGAN

John W. Robinson, and Ralph N. Dietrich, both of Jasper, Ind., assignors to Kimball International, Inc., Jasper, Ind.

Filed Jan. 5, 1978, Ser. No. 867,112
Int. Cl.[2] G10H *1/00, 5/00*
U.S. Cl. 84—1.03 **15 Claims**

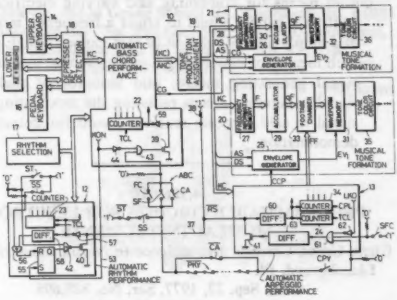


1. A method for generating rhythm pulses in an electronic musical comprising:
storing a first plurality of rhythm patterns and a second plurality of rhythm patterns in a memory,
producing a series of cyclically repeating binary word counts which are rhythmically spaced and which each includes a most significant bit and a plurality of least significant bits,
selecting a pattern from each of the first and second plurality of patterns, and
addressing the memory by means of the least significant bits of the series of counts to call forth one of the selected patterns to produce a series of rhythm pulses when the most significant bit of count is at a logic 1 and to call forth the other of the selected patterns to produce an alternative series of rhythm pulses when the most significant bit of the count is at a logic 0.

4,186,640
ELECTRONIC MUSICAL INSTRUMENT

Teruo Hiyoshi; Akira Nakada; Yasuji Uchiyama; Eiichi Yamaga, and Eiichiro Aoki, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu-shi, Japan

Filed Feb. 13, 1978, Ser. No. 876,913
Claims priority, application Japan, Feb. 16, 1977, 52-15920
Int. Cl.[2] G10H *1/00, 5/00*
U.S. Cl. 84—1.03 **5 Claims**



1. An electronic musical instrument including a plurality of automatic performance devices of different functions, said instrument comprising:
a common control line connecting said automatic performance devices to one another,
each one of said automatic performance devices comprising:
a control signal delivery circuit which, in response to a performance stop instruction provided to that one automatic performance control device, delivers out a control signal on said common control line, and
a control signal receiving circuit which detects presence or absence of the control signal on said common control line and thereby controls the performance operation of that one automatic performance device.

4,186,641
WIRELESS TOY MUSICAL INSTRUMENT

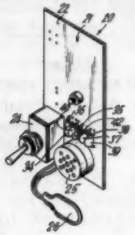
Steven R. Dorfman, Fairfield, Conn., assignor to Carnival Toys, Inc., Bridgeport, Conn.

Filed Jun. 22, 1978, Ser. No. 918,087
Int. Cl.[2] G10H *1/00*
U.S. Cl. 84—1.16 **14 Claims**

1. A wireless toy musical instrument for transmitting the output thereof to a separate receiver means comprising:
a hollow body member;
non-metallic string means for generating an audio signal disposed on said hollow body member;
sound transducer microphone means for converting said audio signal to a varying electrical signal, said sound transducer means being disposed within and bonded to said body member such that it fixedly abuts against the inner surface of said hollow body member, said sound transducer microphone means generating a voltage output which varies in accordance with the different sounds

received from said string means and the vibrational forces mechanically transmitted from said hollow body member to said sound transducer microphone means;

circuit means for generating a carrier signal having a predetermined radio frequency, said circuit means including an LC circuit;



circuit means for combining said varying electrical signal with said carrier signal to effect a frequency modulation and amplitude modulation of said carrier signal; and

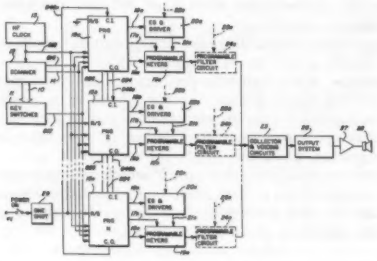
switch means for connecting a power source to said carrier signal generating means, said inductor of said carrier signal generating means radiating the modulating carrier signal to said separate receiver means for detection and demodulation.

4,186,642

PROGRAMMABLE CIRCUITS FOR ELECTRONIC MUSICAL INSTRUMENTS

Glenn Gross, Chicago, Ill., assignor to Norlin Industries, Inc., Lincolnwood, Ill.

Filed Sep. 22, 1977, Ser. No. 835,695
Int. Cl.[2] G10H *1/02*
U.S. Cl. 84—1.24 **72 Claims**



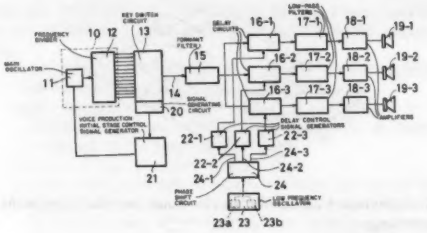
1. In an electronic musical instrument having musical note selection means producing a first control signal for note selection purposes, and circuit means for producing electrical tone signals, said circuit means including at least one circuit which is frequency-dependent by virtue of the fact that it has means defining a critical charging or discharging rate, which critical rate is suitable for operation only over a limited musical frequency range, and note assignment means responsive to said note selection signal to assign said frequency-dependent circuit to participate in the production of a tone signal within a range of musical frequencies exceeding its limited operating range; the improvement wherein: said note assignment means produces a second control signal for programming purposes, and said circuit means includes programming means responsive to said program control signal for adjusting said critical charging or discharging rate to suit the frequency of a selected musical note which is assigned to said frequency-dependent circuit by said note assignment means.

4,186,643

APPARATUS FOR CHORUS EFFECT IN ELECTRONIC MUSICAL INSTRUMENTS

Kouji Nishibe, Okegawa, and Nobuaki Kondo, Saitama, both of Japan, assignors to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Filed Apr. 26, 1978, Ser. No. 900,645
Claims priority, application Japan, Feb. 7, 1978, 53-11988
Int. Cl.[2] G10H *1/06, 5/00*
U.S. Cl. 84—1.24 **8 Claims**



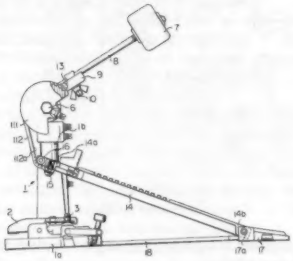
1. Apparatus for chorus effect in an electronic musical instrument comprising: a musical tone signal generator; a passing circuit for a musical tone signal obtained from said musical tone signal generator; a plurality of variable delay circuits connected to said passing circuit; a plurality of delay control signal generators for generating a plurality of delay control signals, said variable delay circuits being individually controlled by said plurality of delay control signals generated by said delay control signal generators; said passing circuit for the musical tone signal having a formant filter interposed therein and a keying signal generating circuit; a voice production initial stage change control signal generator having an output terminal; an output terminal on said keying signal generating circuit and being connected to said voice production initial stage change control signal generator; said output terminal of said voice production intial stage control signal generator being connected to said musical tone signal generator.

4,186,644

FOOT PEDAL ASSEMBLY FOR DRUMS

Makoto Kurosaki, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Jul. 14, 1977, Ser. No. 815,655
Claims priority, application Japan, Jul. 16, 1976, 51/94548[U]
Int. Cl.[2] G10D *13/02, 13/00*
U.S. Cl. 84—422 R **1 Claim**



1. A foot pedal assembly for percussion musical instruments, comprising:

a pedal frame; an axially rotatable main shaft substantially horizontally carried by said pedal frame;

a rocker cam which is fixedly mounted on and is rotatable

with said main shaft and connected to a percussion head; said cam having spaced apart peripheral indentations running in the axial direction of said rocker cam and said cam indentations defining teeth between the indentations around the periphery of said cam;

a foot pedal spaced from and movable with respect to said cam;

a strap of resilient sound-deadening material longitudinally reinforced with substantially non-stretchable elements and fixedly connected at one end to the periphery of said rocker cam; said strap being connected at the other end to said foot pedal to be moved by movement of said foot pedal; said strap having transverse indentations defined on one surface thereof and running in the width direction across said belt; said strap indentations being so shaped and spaced and said foot pedal and said strap being so oriented and positioned and being movable so that said strap indentations are meshingly engageable with said teeth of said cam and the length portion of said strap which is wrapped over said cam periphery being thus meshingly engaged; said strap indentations being on at least that portion of said strap that can pass in contact with said cam as said foot pedal is operated;

further comprising a guide roller rotatably mounted to said foot pedal and about which said strap is entrained as said strap extends to the location at which it is attached to said foot pedal;

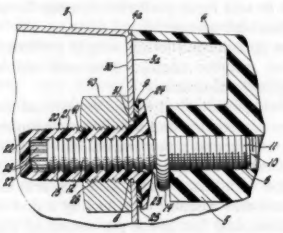
in which said guide roller is provided with peripheral indentations that define teeth on said guide roller and the teeth run in the axial direction of said guide roller and said strap is provided with said indentations which are meshingly engageable with said teeth of said guide roller; said indentations being formed on at that portion of the surface of said strap which is to be entrained about and in contact with said guide roller teeth.

4,186,645

PLASTIC PLUG, NUT AND STUD FASTENER ASSEMBLY

Wieslaw S. Zaydel, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 2, 1977, Ser. No. 856,644
Int. Cl.[2] F16B *13/04*
U.S. Cl. 85—83 **2 Claims**



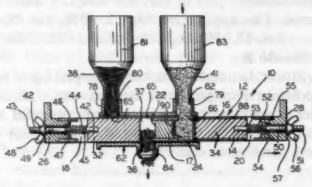
1. A fastener assembly for securing a first member to a second member having at least one aperture therethrough, said fastener assembly including a plastic push-on stud retainer having a flange head portion adapted to be in close proximity to one side of the second member and an integral axially elongated tubular wall portion, defining a hollow crown portion closed by an end wall, extending from said flange head portion and frictionally engaged in the aperture of the second member with said end wall being positioned outward from the opposite side of the second member, said crown portion providing a throat portion adjacent said flange head portion that opens into a socket cavity within said hollow crown portion and a plurality of circumferentially spaced apart longitudinal ribs extending radially inward from said tubular wall portion to define a stud receiving opening having an original, as fabricated, predetermined minor internal diameter, a stud fixed at one end to said first member, said stud having a shank with a series of annular retention grooves thereon extending outward from said first member to project into said stud receiving opening in said hollow crown portion of said push-on stud retainer, the major outside diameter of said shank being complementary to said minor internal diameter of said stud receiving opening whereby said first member is frictionally supported by said second member, and nut means having a bore therein provided with internal threads threaded onto said hollow crown portion of said push-on stud retainer whereby said internal threads cause the material of said longitudinal ribs of said hollow crown portion to flow radially inward into said annular retention grooves to lock said push-on stud retainer to said shank of said stud.

4,186,646

ADJUSTABLE CHARGING BAR

Carl D. Martin, 18824 Grade School Rd., Caledonia, Ill. 61011

Continuation of Ser. No. 389,121, Aug. 17, 1973, abandoned.
This application Feb. 13, 1978, Ser. No. 877,256
Int. Cl.[2] F42B *33/02*
U.S. Cl. 86—29 **4 Claims**



1. A charging bar for loading or reloading shells and cartridges comprising:

a body having at least one elongated compartment therein;

a resilient sealing liner disposed entirely within and lining said compartment and closing one end thereof;

a piston movable in said compartment within said liner, and resilient seal means carried by the inner end of said piston for cooperation with said liner to define a measuring chamber for receiving a substance used in said shells, said liner sealing the space between said piston and said body and cooperating with said seal means to inhibit the passage of the substance therebetween from the measuring chamber.

4,186,647

MULTIPLE AREA REAR LAUNCH TUBE COVER

Edward T. Piesik, Pomona, Calif., assignor to General Dynamics Corporation, Pomona Division, Pomona, Calif.

Filed Aug. 9, 1978, Ser. No. 932,245
Int. Cl.[2] F14F *3/04*
U.S. Cl. 89—1.8 **8 Claims**

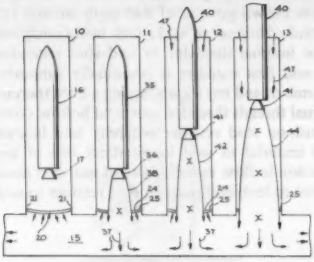
1. Apparatus for normally closing one end of a launch tube for exhaust-propelled vehicles and for opening the end of the launch tube in response to the exhaust plume of the vehicle, said apparatus comprising:

a launch tube;

a duct disposed adjacent said launch tube for conducting away the exhaust of the vehicle; and

a cover for normally blocking connection between said launch tube and said duct, said cover having at least one

frangible central section capable of breaking in response to the pressure of the exhaust plume of the vehicle, thereby



to establish connection between said launch tube and said duct.

4,186,648

ARMOR COMPRISING BALLISTIC FABRIC AND PARTICULATE MATERIAL IN A RESIN MATRIX

Carol W. Clausen, and Eugene J. Davis, both of 1715 E. Florence, Los Angeles, Calif. 90001

Continuation-in-part of Ser. No. 804,230, Jun. 7, 1977, abandoned. This application May 1, 1978, Ser. No. 901,327

Int. Cl.[2] B32B *5/28;* **F41H** *1/02, 5/00*

U.S. Cl. 89—36 A **19 Claims**

1. An armor laminate structure comprising a resin matrix with oppositely disposed front and rear surfaces and containing a filler of metal abrading particulate material and flexible woven ballistic fabric in supported engagement within the matrix and particulate material.

4,186,649

REGULATORS

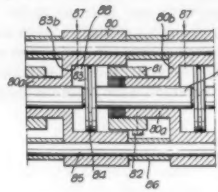
Nils E. Sundstrom, Sodertalje, Sweden, assignor to AB Westin & Backlund, Stockholm, Sweden

Filed Mar. 1, 1977, Ser. No. 773,298

Claims priority, application Sweden, Mar. 3, 1976, 7602985

Int. Cl.[2] F01B *7/00;* **F15B** *15/24*

U.S. Cl. 91—170 R **4 Claims**



1. In a regulator comprising a number of units connected in series, each of which units comprise a fixed body, and, for axial movement, a pressure transmitting element displaceable relative to that body, said pressure transmitting element via a shaft cooperating with the pressure transmitting element of the next adjacent said unit and said shaft in combination with the shafts of the other said units providing an output shaft that effectively extends through the regulator, said units when assembled defining a corresponding number of pressure chambers to which a working medium can be fed and from which said working medium can be discharged in dependence upon control means, the improvement which comprises: (a) said fixed body in each unit has a pressure wall and an open end, (b) between the pressure wall and the pressure transmitting element there is defined a said pressure chamber, (c) there is provided for the output shaft of each pressure chamber of each said unit a stop means is (i) adjustable over a range of movement for limiting axial movement of its associated pressure transmitting element (ii) located outside of each said pressure chambers of the regulator, and (iii) comprises setting and locking means and (d) said pressure wall of each fixed body has an external hub along which a sleeve can be adjusted in continuous manner to adopt different axial positions relative to the fixed body, thereby affording said adjustable stop means.

4,186,650

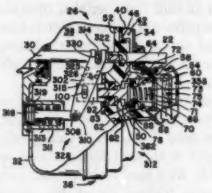
INTERNAL FORCE MULTIPLIER FOR A SERVOMOTOR

Oswald O. Kytta, South Bend, Ind., assignor to The Bendix Corporation, Southfield, Mich.

Division of Ser. No. 736,665, Oct. 28, 1976, Pat. No. 4,086,842. This application Feb. 17, 1978, Ser. No. 878,841

Int. Cl.[2] F15B *9/10, 13/10, 15/02*

U.S. Cl. 91—369 A **3 Claims**



1. A servomotor comprising:

a housing having a cavity therein;

wall means for dividing said cavity into a first chamber and a second chamber, said first and second chambers being connected to a source of vacuum;

valve means in said wall means for interrupting the communication of vacuum to said second chamber and allowing an operational fluid to be communicated to said second chamber to produce a pressure differential across said wall means;

an input push rod member;

an output push rod member extending from said housing and attached to said input push rod member for supplying a mechanism with an operational force;

a first pivot pin attached to said output push rod member;

a cylindrical member connected to said wall means and engaging said valve means;

a second pivot pin attached to said cylindrical member; and

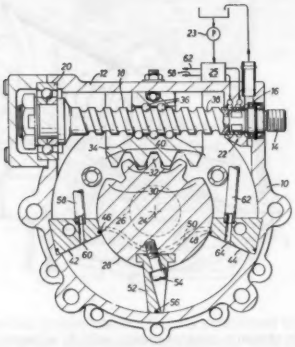
lever means having first and second arm members, each of said first and second arm members having a first end and a second end, each of said first ends forming a pivotal connection with said housing, said first arm member and said second arm member each having a first and second slots therein, said first pivot pin extending through said first slot in each of the first and second arms, said second pivot pin extending through said second slot in each of the first and second arms, said input push rod member moving said output push rod member in response to an operator input, said first pivot pin engaging said second ends of the first and second arms causing said lever means to pivot about said first ends and move said second pivot pin in said second slots, said movement of said second pivot pin operating said valve means to develop said pressure differential, said pressure differential causing said wall means to move and develop an output force, said output force being thereafter transmitted through said second pivot pin into said first and second arms for transmission into said output push rod member through said first pin and thereby proportionally amplify the operational force transmitted from the input push rod member.

4,186,651

HYDRAULIC POWER-ASSISTED ACTUATING ARRANGEMENTS

Alistair G. Taig, South Bend, Ind., assignor to Bendix Westinghouse Limited, Chippenham, England

Filed Jan. 9, 1978, Ser. No. 867,864
Claims priority, application United Kingdom, Feb. 24, 1977, 07939/77
Int. Cl.[2] F15B 9/10; F01C 9/00; F01B 9/00
U.S. Cl. 91—375 R 3 Claims



1. A hydraulic power-assisted actuating arrangement comprising:

(a) a hydraulic control means having a first rotary member and a second rotary member, said first and second rotary members being mutually rotationally coupled to vary the relative magnitudes of two hydraulic values to derive first and second hydraulic pressures in accordance with the relative rotational displacement between said first and second rotary members;

(b) a motion-translating means having an input member coupled to the second rotary member of said control means to be movable thereby, and said motion-translating means including an output portion movable by rotation of the second rotary member;

(c) a rotatable actuating member coupled to the movable output portion of said motion-translating means to be rotatable thereby; and

(d) a rotary vane hydraulic actuator means comprising a part-annular volume defined between static volume-enclosing means and the surface of a movable vane-mounting part of the rotatable actuating member, said part-annular volume being divided into first and second mutually inversely variable volumes by an angularly movable vane mounted on said movable vane-mounting part and directly connected to said rotatable actuating member, and means to convey and admit said first and second hydraulic pressures to said first and second variable volumes respectively to act on opposite major surfaces of said movable vane in such a sense as to produce a net force on said movable vane resulting in application of a torque to said rotatable actuating member in proportion to rotation of the first rotary member of said control means producing relative displacement between said first and second rotary members and tending to turn said rotatable actuating member in the same rotational direction as the rotation of said first rotary member acting through said motion-translating means;

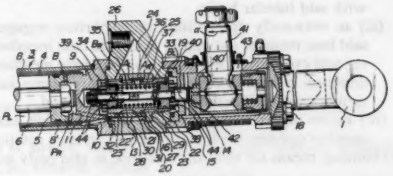
said vane-mounting part having a cylindrical peripheral surface and said static volume-enclosing means sealingly engaging said cylindrical peripheral surface to substantially enclose said part-annular volume.

4,186,652

SERVO VALVE FOR POWER STEERING BOOSTER

Masanori Kouda, Atsugi, Japan, assignor to Atsugi Motor Parts Co., Ltd., Atsugi, Japan

Filed Dec. 27, 1977, Ser. No. 864,806
Claims priority, application Japan, Dec. 28, 1976, 51/159156
Int. Cl.[2] F15B 13/14
U.S. Cl. 91—434 2 Claims



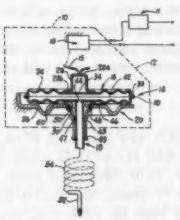
1. A servo valve in combination with a power steering booster comprising a power piston and cylinder assembly and a spool assembly, said power piston and cylinder assembly comprising a hydraulic cylinder, a reciprocatively movable piston rod and a power piston integrally clamped thereto and slidably movable within said hydraulic cylinder, said spool assembly comprising a hollow spool for controlling selective supply and discharge of pumped hydraulic pressures onto and from both sides of said power piston, a pair of reaction pistons having different pressure receiving areas corresponding to those on both sides of said power piston and slidably fitted within ends of said hollow spool to form a reaction hydraulic chamber therebetween, a reaction spring interposed between said reaction pistons against which said reaction pistons slidably move within said spool and having a steering input transmission shaft passing through said reaction pistons, and cover plates being retained by the ends of said steering input transmission shaft for closing the ends of said hollow spool, said spool assembly further comprising reaction support pins respectively held in guide holes formed in said cover plates between said respective reaction pistons and partitions located at ends of a housing forming the servo valve body, said housing slidably accommodating said spool assembly and including ports for said selective supply and discharge of hydraulic pressures.

4,186,653

BELLOWS ASSEMBLY AND METHOD OF MAKING THE SAME

Walter V. Hobbs, Columbus, Ohio, assignor to Ranco Incorporated, Columbus, Ohio

Filed Nov. 1, 1977, Ser. No. 847,427
Int. Cl.[2] F16J 3/04
U.S. Cl. 92—34 5 Claims



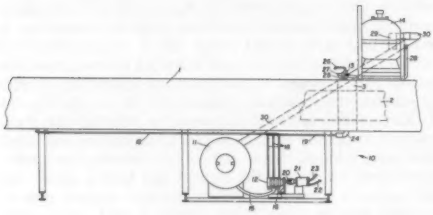
1. A bellows assembly comprising:

(a) a bellows head including a thin walled flexible member defining at least part of an expansible chamber and having an aperture therein;

(b) a tube communicating with the chamber via said aperture;

(c) a rigid base member supporting said bellows head and extending along said flexible member, said base member defining an opening aligned with said aperture;
(d) a fitting interconnecting said flexible member, tube and base member comprising:
(i) a thin walled tubular body surrounding said tube and extending through said base member opening;
(ii) a flange disposed between said base member and said flexible member, said flange bonded to said flexible member about said aperture so that said aperture is aligned with said tubular body;
(iii) an outwardly upset fitting body portion engaged with said base member outwardly from said base member opening and exerting a force acting on said base member in the direction of said bellows head to firmly clamp said base member and said bellows head together; and,
(iv) means interposed between said fitting and said base member opening for locking against relative rotation; and
(e) bonding means for securing said tube in said body member.

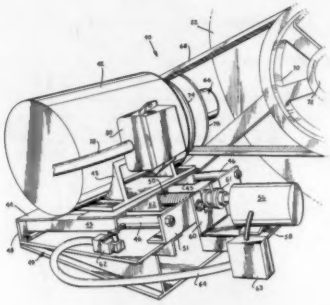
4,186,654
RECIRCULATING LUBRICATION SYSTEM
David G. Scott, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.
Filed May 18, 1978, Ser. No. 906,899
Int. Cl.[2] F01B *31/00*
U.S. Cl. 92—78 **2 Claims**



1. An improved lubrication system for the seal means retained within the packing gland of the fluid end of a multiplex pump having reciprocating piston means therein sealingly engaged by said seal means, said improved lubrication system having lubricant reservoir means containing lubricant therein, wherein the improvement in said lubrication system comprises:
positive displacement pump means connected to said lubricant reservoir means supplying said lubricant to said seal means;
filtration means filtering contaminants from said lubricant after exiting from said seal means but before the return thereof to said lubricant reservoir means; and
three-way two-position valve means to direct the flow of said lubricant from said seal means, said three-way two-position valve means operable between a first position directing the flow of said lubricant fluid flow from said seal means through said three-way two-position valve means to said filtration means and a second position directing the flow of said lubricant from said seal means through said three-way two-position valve means onto said piston means.

4,186,655
METHOD AND APPARATUS FOR CONTROLLING FORCED AIR HEATING AND/OR COOLING
Lewis B. Mallory, 5370 Silver Hill Trail, Stone Mountain, Ga. 30083, and Bob W. Dean, 760 Old Ivy Rd., Atlanta, Ga. 30342
Filed May 22, 1978, Ser. No. 908,015
Int. Cl.[2] F24F *11/04, 3/00*
U.S. Cl. 98—1 **3 Claims**

1. In a control system for heating and/or air conditioning system in a building having areas and wherein there is an air passage means such as a duct or conduit leading from a furnace of air cooling means in which there is located an air moving means such as a blower or fan for moving air, one or more individual means such as variable volume boxes located in communication with said air passage means to increase or decrease the supply of air therein, and a plurality of temperature sensing devices in different locations in a building to sense the increase or decrease of temperature therein for controlling the air moving means, the improvement comprising:
(a) a plurality of pressure sensing means located in different locations within said duuct system to sense a change of pressure therein and to generate a signal to actuate,

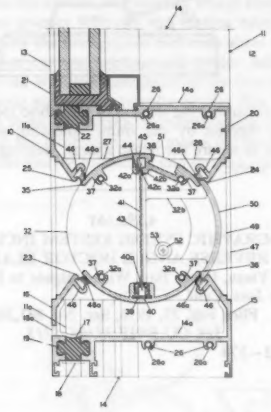


(b) an air moving control means which accepts the signals from the various duct pressure sensing means and compares said signals to determine the signal to send to the air moving means, and
(c) means for varying the speed of the air moving means in response to the signal received from said comparing instrument,
(d) said means for varying the speed of the air moving means comprising a pulley drive such as a belt member, a variable pulley responsive to changes in tension on said pulley drive member, and electrical drive means for changing pulley tension.

4,186,656
THERMAL BREAK VENTILATOR UNIT
Ronald J. Weber, Wausau, Wis., assignor to Wausau Metals Corporation, Wausau, Wis.
Filed Jan. 23, 1978, Ser. No. 871,218
Int. Cl.[2] E06B *7/03*
U.S. Cl. 98—99 R **13 Claims**

13. In a thermal break frame having opposed end jambs each having spaced internal and external panels connected by a structural heat transfer barrier of substantially lower heat conductivity than the connected panels, a thermal break ventilator unit comprising, in combination:
(a) spaced thermal break sections extending between and connected to the opposed end jambs to define a ventilating passage therebetween, the thermal break sections each having spaced internal and external panels connected by a structural heat transfer barrier of substantially lower heat conductivity than the connected panels, the internal and external panels of the thermal break sections respectively defining therebetween interior and exterior ventilating openings of the ventilating passage,
(b) opposed inner and outer closure panels connected in spaced relation by plates of low heat conductivity to form a closure unit positioned for movement within the ventilating passage, the inner closure panel closing the interior ventilating opening and the outer closure panel closing the exterior ventilating opening, the plates and a closed air space extending between the closure panels cooperating to provide a thermal break for interrupting the flow of heat between the panels when the closure unit is positioned in its closed position and both closure panels per-

mitting substantially unrestricted air flow through the ventilating passage when the closure unit is positioned in its open position, the plates each having an extended arcuate support surface, and



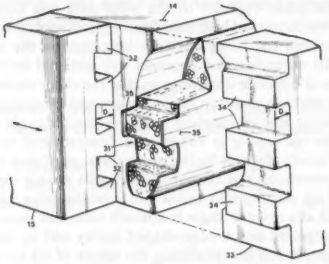
(c) at least one guide member fixedly positioned between the thermal break sections in engagement with the arcuate support surface of each plate to support the plate arcuate surface in rotatable relation with respect to the thermal break sections and permit rotational movement of the closure unit between its open and closed positions.

4,186,657

APPARATUS FOR SHEARING SPENT NUCLEAR FUEL ASSEMBLIES

Bradley S. Weil, and Curtis F. Metz, III, both of Knoxville, Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Dec. 7, 1978, Ser. No. 967,469
Int. Cl.[2] B30B *13/00*
U.S. Cl. 100—39 **5 Claims**



1. A method for shearing spent nuclear fuel assemblies of the type including an array of fuel pins disposed within an outer metal shroud into small uniform segments for subsequent dissolution of contained fuel values comprising:

(a) reducing the cross section of the fuel assembly by progressively pressing it between gags until it has a compressed end with a substantially reduced cross sectional area relative to the cross section of the uncompressed fuel assembly; and

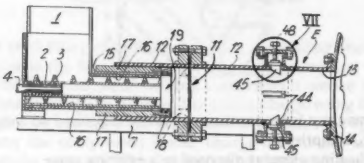
(b) shearing segments from the compressed end of said fuel assembly by driving a movable shearing blade against one side of said compressed end while maintaining a fixed shearing blade against the opposite side of said compressed end, said fixed and movable shearing blades each having a plurality of spaced-apart, laterally projecting, generally rectangular teeth which are displaced to intermesh in a sliding contiguous relationship during a shearing operation, said fuel assembly being advanced a distance equal to or less than the lateral projection of said teeth after each shearing operation.

4,186,658

APPARATUS FOR CONVEYING PARTICULATE MATERIAL

Douglas B. Brown, Ottawa, Canada, assignor to Stake Technology Ltd., Ottawa, Canada

Division of Ser. No. 762,093, Jan. 24, 1977, Pat. No. 4,119,025.
This application Aug. 3, 1978, Ser. No. 930,677
Int. Cl.[2] B30B *9/38, 11/24*
U.S. Cl. 100—148 **3 Claims**



1. Apparatus for feeding a mass of material comprised of solid particles, from an outlet of hopper means to a processing means for processing of said material, said apparatus comprising, in combination:

(a) screw conveyor means for advancing said mass in a generally axial direction away from the outlet of said hopper means, towards an inlet of a tubular conduit, the outlet of said conduit being in a permanent communication with said processing means, said conduit extending generally coaxially with said conveyor means;

(b) an intermediate chamber at the discharge end of said conveyor means, said intermediate chamber being generally coaxial with said conveyor means, being located between said conveyor means and said conduit means, and normally being in a communication therewith;

(c) reciprocating piston means having a forward face end disposed at said intermediate chamber for a reciprocating movement generally coaxially with said screw conveyor means, said forward face of said piston means being turned towards said processing means, said piston means being of the type of an annular piston whose outside diameter generally corresponds to the inside diameter of said conduit, the inside diameter of said piston generally corresponding to the outside diameter of said screw conveyor means, the discharge end of said screw conveyor means being telescopically received inside said annular piston, whereby the portion of the interior of said annular piston between the discharge end of the conveyor means and the face of said piston means forms said intermediate chamber;

(d) first drive means for rotating said screw conveyor means and second drive means for reciprocating said piston means;

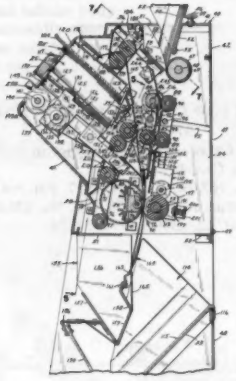
whereby said conveyor means is arranged to advance said mass to said intermediate chamber means, while further advance of said mass through said conduit is effected solely by compressive action of said face of the piston means.

4,186,659

MACHINE FOR ADDRESSING CARDS AND ENVELOPES

Ronald A. Rogers, Apple Valley; Ansel J. Wright, Minneapolis, and William H. Wright, Hopkins, all of Minn., assignors to Master Addresser Company, Minneapolis, Minn.

Filed Nov. 25, 1977, Ser. No. 854,611
Int. Cl.[2] B41L *45/00*
U.S. Cl. 101—47 **30 Claims**



1. A machine for reproducing material imprinted on a master element, comprising:

(a) a heating element disposed in a printing zone;

(b) a master element having indicia of heat conducting material thereon;

(c) means for feeding said master element through the printing zone;

(d) means for feeding a print receiving member through the printing zone outwardly of the master element relative to the heating element and in the same direction as said master element;

(e) a length of heat transferrable printing medium equipped flexible sheet material;

(f) means for supporting the length of flexible sheet material under predetermined tension between said master element and said print receiving member;

(g) means for intermittently advancing a predetermined length of the flexible sheet material through the printing zone against the tension of the supporting means in the same direction as said master element;

(h) and pressure means for pressing the master element, flexible sheet material and print receiving member together during movement thereof through said printing zone.

4,186,660

SCREEN-PRINTING FRAME WITH PLASTIC SIDE BARS BONDABLE TO FABRIC BY SURFACE-SOFTENING

John W. Key, 1385 Camino Teresa, Solana Beach, Calif. 92075

Filed Oct. 3, 1977, Ser. No. 838,680
Int. Cl.[2] B41F *15/36*
U.S. Cl. 101—128.1 **13 Claims**

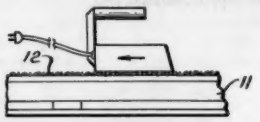
1. The method of making a printing screen consisting of a screen fabric and a frame, including the steps of:

providing a frame having at least the structural surface thereof for receiving fabric thereon formed of a plastic material capable of having its exposed surface rehardenably softened;

tensioning the fabric across said frame and in direct contact with said structural surface;

superficially softening said surface;

impressing the fabric into the softened material of said surface; and



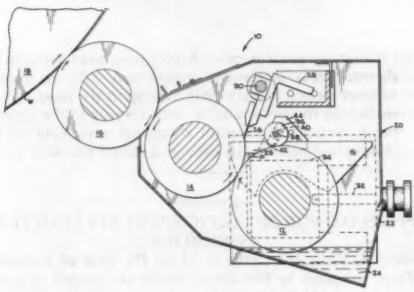
while maintaining the tension of the fabric independently of action thereon by the frame, allowing said surface to harden to secure the fabric against yielding to the tension of the fabric.

4,186,661

FLEXOGRAPHIC INKING SYSTEM INCLUDING A REVERSE ANGLE DOCTOR BLADE

William J. Vieau, Green Bay, Wis., assignor to FMC Corporation, San Jose, Calif.

Filed Feb. 27, 1978, Ser. No. 881,205
Int. Cl.[2] B41F *31/06, 5/18*
U.S. Cl. 101—178 **4 Claims**



1. A flexographic printing station for imparting a graphic pattern to a web supported by a platen roll, said station comprising a pan containing a supply of ink, a fountain roll, an anilox roll containing a graphic cell pattern forming a nip with said fountain roll, and a plate cylinder for transferring a pattern from the plate cylinder to the web; said pan being located below the centers of both said fountain roll and said anilox roll, said fountain roll being partially immersed in the ink supply, mean for mounting said fountain roll and said anilox roll for rotation in opposite directions so that the outer surfaces of said rolls at said nip move in the same upward direction, said surfaces being spaced apart to define a gap through which ink from the ink supply is fed by said fountain roll to a wedge-shaped cavity defined by the outer surfaces of said rolls above a line containing the centers of said rolls at said nip so that a pool of ink coating said anilox roll is produced, a doctor blade disposed at a reverse angle in contact with said anilox roll, and means adjacent said wedge-shaped cavity and in contact with said fountain roll for restricting the return of ink to said pan to thereby maintain a supply of ink in said wedge-shaped cavity.

4,186,662

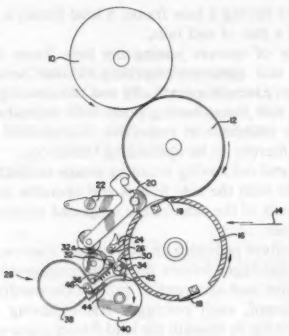
DUPLEXING COPYING SYSTEM

Lawrence Borneman, Lombard, Ill., assignor to A. B. Dick Company, Chicago, Ill.

Filed Aug. 22, 1977, Ser. No. 826,847
Int. Cl.[2] B41F *5/02, 13/28, 21/04, 21/08*
U.S. Cl. 101—218 **14 Claims**

1. In a duplicating system for duplicating images on both sides of copy sheets including a surface for carrying first and second images transferable to the copy sheets, a carrier, drive

means for moving said surface and carrier in unison, means for feeding the copy sheets between the surface and the carrier, gripper means associated with the carrier for gripping edges of said sheets and for holding the sheets on the carrier, said gripper means comprising first and second grippers for separately holding sheets on the carrier, said feeding means feeding each sheet to the first gripper whereby the leading edge of each sheet is engaged by the first gripper and each sheet is moved between the image carrying surface and carrier, said feeding being synchronized with the movement of the first image on the image carrying surface for transfer of said first image to one side of each sheet, and means for releasing said sheet from said first gripper, the improvement in means for handling said sheets after release and for re-feeding said sheets to said second



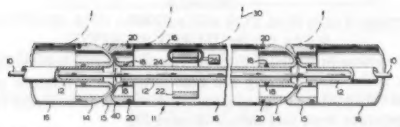
gripper, said handling and re-feeding means comprising fixed stripper means positioned adjacent said carrier, sheet drive means positioned beyond said stripper means, a sheet reversing station, said sheet drive means directing each sheet to said reversing station, said reversing station including second sheet drive means movable in a direction opposite said first mentioned sheet drive means for re-feeding the sheets to said carrier, said second gripper engaging the formerly trailing edge of said sheets opposite the edge held by said first gripper, said sheets being re-fed to said second gripper in synchronism with the second image on said image bearing surface for duplication of said second image on the opposite side of each sheet, and means for releasing said sheets from said second gripper for delivery of the sheets to a receiving area.

4,186,663

TRANSFORMER MOVABLE ALONG POWER CABLE

Westley F. Curtis, 9499 MacArthur Blvd., Washington, D.C. 20854

Filed Feb. 3, 1958, Ser. No. 713,070
Int. Cl.² B63G *9/00*; F42B *22/26*
U.S. Cl. 102—18 MS **9 Claims**



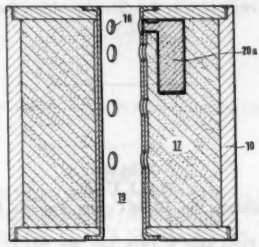
6. A torpedo detecting and explosive charge carrying mechanism comprising an electrically conductive cable, a shielding means adapted to slide on said cable for minimizing the effect of electrically induced eddy currents, and means for transferring power from said cable mounted within said shielding means.

4,186,664

SMOKE PROJECTILE CHARGE AND PROCESS FOR ITS MANUFACTURE

Paul Huber, Haus Nr. 9, 8234 Unterjettenberg; Alois Schiessl, Hochfeldstrasse 26, 8231 Weissbach-Marzoll, and Hartmut Krone, Bertholdstrasse 4, 7844 Neuenburg, all of Fed. Rep. of Germany

Filed Dec. 8, 1976, Ser. No. 752,637
Claims priority, application Fed. Rep. of Germany, Dec. 9, 1975, 2555323
Int. Cl.² F42B *13/14*; C06B *33/02*
U.S. Cl. 102—66 **7 Claims**



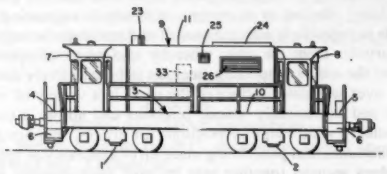
1. A shell filling of smoke pots which are stacked one above the other in the firing direction in the shell casing and which comprise a closed metal housing comprising a smoke charge completely filling the housing, the smoke charge being formed by high compression under a pressure of at least 1300 kp/cm², whereby the compressed smoke charge contributes substantially to the support of the above-stacked charges and provides a self-supporting smoke charge structure, wherein the smoke charge incorporates an ignition charge, the smoke charge and the ignition charge being compressed together to form a common block of uniform compression, and wherein the smoke charge comprises a chlorinated organic compound, zinc oxide and metal powder, the zinc oxide being calcined at at least 900° C. before being mixed with other components of the smoke charge, whereby the smoke charge possesses enhanced storage stability.

4,186,665

LOCOMOTIVE ENGINE HOUSING ARRANGEMENT

Hendrikus de Jong, Castricum, and Joseph A. Welboren, Heemskerk, both of Netherlands, assignors to Hoogovens Ijmuiden, B. V., Ijmuiden, Netherlands

Filed Oct. 31, 1977, Ser. No. 847,104
Claims priority, application Netherlands, Nov. 9, 1976, 7612405
Int. Cl.² B61C *5/00, 17/04*; B61D *39/00, 49/00*
U.S. Cl. 105—456 **7 Claims**



1. A railway locomotive having at least one cab at one end thereof for an operator, an engine and associated apparatus intermediate the ends of said locomotive a unitary movable enclosure, rectangular in plan, having a roof, two side walls and two end walls enclosing and covering the said engine and associated apparatus, and power-operated lifting means comprising four vertical screw jacks positioned within the enclosure when enclosing said engine, and associated apparatus, two

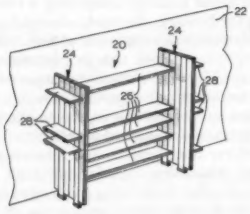
synchronized alternating-current motors and a common drive for each two of said jacks for lifting the said enclosure upwardly as a unit to provide access to the said engine and associated apparatus, two of said screw jacks being at each longitudinal end of the enclosure coupled by said common drive shaft extending along the short side of the enclosure, each said drive shaft being driven by said synchronized alternating-current motor, whereby when driven from a common suitable current supply, the two drive motors drive all four screw jacks at the same speed, the said side and end walls of the enclosure having sound-insulating material on their inner faces and the cab having a wall adjacent to and spaced from one of the said end walls of the enclosure in the closed position thereof.

4,186,666

WALL UNIT

Reuben Honickman, Ste. 4B, 66 Collier, Toronto, Canada (M4W 1L9)

Filed May 5, 1978, Ser. No. 903,322
Int. Cl.[2] A47B *41/04*
U.S. Cl. 108—29 **8 Claims**



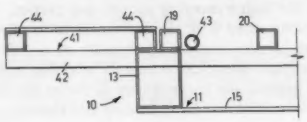
1. A wall unit comprising a relatively rigid, self-supporting panel having a generally flat outer surface and which is adapted to be supported in use with said outer surface generally vertical, said panel being of a rectangular shape and of a substantial width selected to allow a shelf to be positioned across the width of and supported solely by the panel with the ends of the shelf disposed adjacent opposite sides of the panel, said panel being formed with an array of openings which cover substantially the whole of its outer surface and which are arranged in a multiplicity of vertical rows spaced equally from one another with the openings in each row in horizontal alignment with corresponding openings in adjacent rows, said openings extending through the panel to an inner surface thereof and being adapted to co-operate with article supporting elements engageable in selected ones of said openings for supporting articles from the unit, whereby said array of openings allows the article supporting elements to be selectively distributed over said outer surface of the panel in a variety of vertically and horizontally spaced positions and allows a correspondingly wide range of positions for articles supported by said elements, said panel being made up of a plurality of tubular members secured together side by side, each member itself comprising two identical channel elements having generally flat bases and secured together with their channels facing inwardly, each said element having two side flanges disposed generally normal to the base of the element, the edges of said flanges being secured together to form said tubular members, whereby the bases of said channel elements co-operate with the bases of the channel elements of adjacent members in the panel to form front and rear walls of the panel.

4,186,667

MULTI-PURPOSE PALLET

Terence D. Seabrook, 944-956 South Rd., Edwardstown, Australia

Filed Jun. 2, 1978, Ser. No. 911,965
Int. Cl.[2] B65D *19/30*
U.S. Cl. 108—53.5 **7 Claims**



1. A pallet having a base frame, a load frame, a pair of side frames, and a pair of end rails,

a plurality of spacers joining the base frame to the load frame, said spacers comprising tubular section corner members extending vertically and constituting sockets,

each said side frame having posts with depending ends releasably insertable in respective said sockets to be supported thereby to be upstanding therefrom,

each said end rail having retaining means releasably interengageable with the side frames and operable to retain the upper ends of the side frames in spaced relationship with each other,

support shelves provided on said corner spacers,

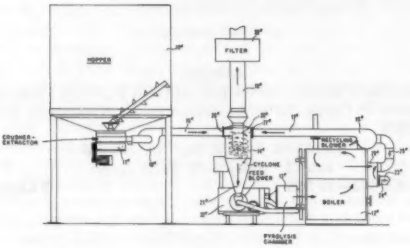
a pair of outrigger frames releasably engageable with the load frame and arranged to project outwardly from the ends thereof, each outrigger frame having projecting beams which lie beneath the load frame, a bearer interconnecting the beams of each outrigger frame, said bearer having end portions which are restable upon a pair of said shelves.

4,186,668

SYSTEM FOR THE PYROLYTIC COMBUSTION OF LIGNEOUS AND OTHER WASTES

Rene Tabel, Laroquebrou, Cantal, France

Filed Jan. 26, 1978, Ser. No. 872,503
Claims priority, application France, Jan. 26, 1977, 77 03550; May 17, 1977, 77 15823; Oct. 13, 1977, 77 31393
Int. Cl.[2] F23G *5/12*
U.S. Cl. 110—213 **18 Claims**



1. A system provided with a pyrolytic burner cooperating with a boiler for effecting the combustion of a mixture of divided waste such as ligneous waste entrained in a stream of air to produce heat, said burner comprising:

A. an enclosure defining a pyrolysis chamber having inlet and outlet openings, the mixture being blown into the inlet opening and being advanced in said chamber in a flow path from the inlet to the outlet opening;

B. a metal thermally-conductive core having an elongated form disposed in said enclosure and extending substantially from the inlet to the outlet opening thereof to transfer some

of the heat of combustion from the outlet opening to the inlet opening; and

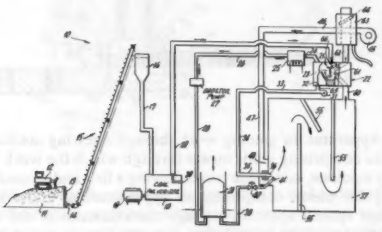
C. means to retard the advance of said mixture in said chamber, said means being constituted by a metallic element having pores therein to define a grid or screen-like structure which divides the chamber into an upstream section and a downstream section with respect to said flow path, the transfer of heat by the core being in a direction opposed to the flow path direction whereby pyrolysis of the mixture takes place in the vicinity of the inlet opening and combustion is substantially complete at the outlet opening.

4,186,669

COAL BURNING PROCESS

Frederick C. Cowan, 82 Cove Rd., Oyster Bay, N.Y. 11771, and Thomas L. Cowan, 68 Green St., Huntington, N.Y. 11743

Filed Sep. 22, 1977, Ser. No. 835,520
Int. Cl.[2] F23K *1/04*
U.S. Cl. 110—347 **12 Claims**



1. A process combining, within a plant boundary, obtaining a volatile hydrocarbon gas from coal in the absence of a combustion supporting atmosphere by devolatilizing coal in a noncombustible atmosphere, leaving residue unburned coal, forming the volatile hydrocarbon gas obtained by devolatilization of coal as a stream physically separate from the unburned devolatilized coal, and thereafter burning at last some of said hydrocarbon gas in a main burner flame together and in physical contact with coal in a common furnace in a combustion supporting atmosphere, the physically separate stream of volatile hydrocarbon gas generated within the plant boundary constituting an auxiliary stream for assisting the main burner flame.

4,186,670

METHOD AND APPARATUS FOR SOWING FOREST SEEDS IN THE HUMUS LAYER

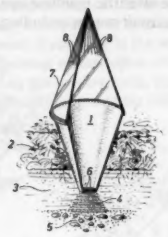
Mats Hagner, Blåbärsvägen 19, S-902 35 Umeå, Sweden

Filed Dec. 12, 1977, Ser. No. 859,519
Claims priority, application Sweden, Dec. 10, 1976, 7613098
Int. Cl.[2] A01C *5/00*
U.S. Cl. 111—1 **7 Claims**

1. A method of sowing forest seeds in a humus layer underlying a surface layer of moss or the like, comprising the steps of:

(a) pressing an inverted funnel-shaped moisture shield having an open lower end through the surface layer and into the underlying humus layer to locally compact the humus layer in the area beneath the lower end of the shield,

(b) depositing forest seeds on the compacted humus layer through the shield, and



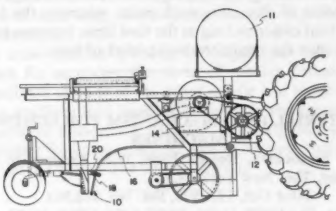
(c) leaving the shield in situ to moisturize the seeds by condensation.

4,186,671

FLUID INJECTION SOIL OPENER FOR PLANTERS

Barney K. Huang, 5108 Kaplan Dr., Raleigh, N.C. 27606

Filed Jun. 17, 1974, Ser. No. 479,619
The portion of the term of this patent subsequent to Sep. 5, 1993, has been disclaimed.
Int. Cl.[2] A01C *11/00*
U.S. Cl. 111—2 **6 Claims**



1. A transplanter with a fluid injection soil opener for forming plant receiving cavities in soil for the transplanter, said transplanter with a fluid injection soil opener comprising: a fluid source containing a volume of a selected fluid; fluid conduit means leading from said fluid source for channeling fluid therefrom; means for pressurizing a certain volume of said fluid from said source; nozzle means operatively connected to said conduit means for selectively directing a certain volume of fluid under pressure downwardly into the soil for forming a plant receiving cavity therein; and planting means associated with said transplanter for depositing plants in the plant receiving cavity after the cavity has been formed by said fluid injection soil opener, said planting means including timing control means for synchronizing the actuation of said nozzle means with said planting means.

4,186,672

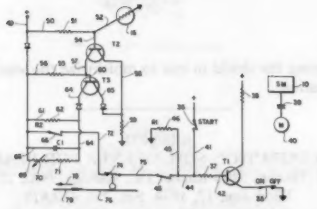
SEWING MACHINE MONITOR

Perry E. Burton, Fountain Inn, S.C., assignor to Opelika Manufacturing Corp., Chicago, Ill.

Filed May 23, 1977, Ser. No. 799,285
Int. Cl.[2] D05B *69/36*
U.S. Cl. 112—273 **7 Claims**

1. Apparatus for controlling the operation of a sewing machine and the like comprising signal input means for transmitting a pulsing signal at a frequency corresponding to the lineal velocity of a thread moving along its length to the machine with an increase of the lineal velocity of the thread causing a higher frequency of pulsing signals and a decrease of the lineal

velocity of the thread causing a lower frequency of pulsing signals, start circuit means for actuating the operation of the machine, and holding circuit means for continuing the operation of the machine after the machine operation has been actuated, said holding circuit means including means responsive to



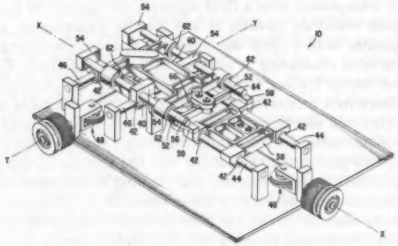
each pulse of the pulsing signal from said signal input means to maintain said holding circuit closed during each pulse, and means for continuing the holding circuit closed for a predetermined period of time after each pulse, whereby the holding circuit is held closed as long as the time lapse between pulses is not more than the predetermined period of time.

4,186,673

MATERIAL FEED MECHANISM FOR SEWING MACHINES

Artin G. Vartoukian, Roselle Park, N.J., assignor to Singer Company, The, New York, N.Y.

Filed Oct. 19, 1978, Ser. No. 952,901
Int. Cl.[2] D05B *21/00*; D05C *9/04*; G05B *19/32*
U.S. Cl. 112—121.15 **9 Claims**



1. A low inertia drive mechanism for imparting variable translational movement to a fabric clamp used for supporting and guiding fabric to be sewn in cooperative disposition with respect to the needle of a sewing machine, said mechanism comprising:

a first, rigid table mounted for translation in a first straight path on a first pair of fixed rods;

a second, rigid table mounted for translation independent of said first table in a second straight path perpendicular to said first straight path on a second pair of fixed rods, said second table having a pair of transverse rods each of which is rigidly mounted on a side of said second table perpendicular to said second pair of fixed rods;

a third, rigid table slidably mounted on said transverse rods;

means for imparting the translational movement of the first table to the third table whereby said third table may move in any direction in a plane parallel to the planes of said first and second tables;

a first stationary servomotor not carried by any of said tables for imparting reciprocatory motion to said first rigid table;

a second stationary sermomotor not carried by any of said tables for imparting reciprocatory motion to said second, rigid table; and

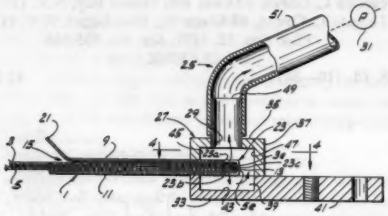
means for connecting said fabric clamp to said third rigid table.

4,186,674

APPARATUS FOR GUIDING WORK THROUGH A SEWING MACHINE OR THE LIKE

William R. Conner, Jr., Shelbyville, Tenn., assignor to Stahl-Urban Company, Brookhaven, Miss.

Filed Nov. 2, 1977, Ser. No. 847,743
Int. Cl.[2] D05B *35/10*
U.S. Cl. 112—153 **15 Claims**



1. Apparatus for guiding work through a sewing machine or the like comprising guide means through which the work is fed to the machine, said guide means having a first and second side, said guide means comprising an upper member and a lower member spaced apart for passage therebetween of the work and an edge guide at said first side of said upper and lower members for engagement by the edge of the work toward said first side as the work travels through said guide means, said guide means being open at said second side and at both ends for passage of the work therethrough and for entry of air to the space between said members, said guide means having at least one air passage at said first side thereof, and vacuum means connected to said air passage for drawing air into said guide means and causing it to flow toward said first side of the guide means and thence out through said air passage, the air flow biasing the work laterally in the direction toward said edge guide for engagement with the edge guide of the edge of the work toward the edge guide, said upper and lower members being spaced apart a distance greater than the total thickness of the work so that the air can flow in the guide means above and below the work in the direction from said second side of the guide means towards the edge guide.

4,186,675

DEVICE FOR DRIVING INFORMATION CARRYING MEMBERS FOR USE IN A SEWING MACHINE

Chikao Yamashita; Takao Sugaya, and Noriyuki Yoshida, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jan. 23, 1979, Ser. No. 5,829
Claims priority, application Japan, Feb. 8, 1978, 53-13112
Int. Cl.[2] D05B *3/02*
U.S. Cl. 112—158 D **7 Claims**

1. A sewing machine comprising:

a machine frame,

a main shaft journaled on said frame,

a needle driven by said main shaft for endwise reciprocation and for lateral oscillation,

a feed dog movably mounted in said frame to cooperate with said needle,

a feed regulator for regulating the length and direction of feed movement of said feed dog,

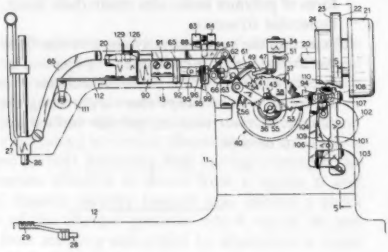
a first information-carrying member with a plurality of bight information recorded thereon for controlling the lateral oscillation and for determining the lateral position of said needle,

a first scanning member for selectively sensing the bight information from said first information-carrying member;

a second information-carrying member with a plurality of feed information recorded thereon, correspondingly to said bight information, for controlling the length and direction of feed movement of said feed dog,

a second scanning member for selectively sensing the feed information from said second information-carrying member and for determining the set position of said feed regulator,

a single step motor including an output shaft to which one of said information-carrying members is secured and the other is loosely fitted,



holding means functioning to normally set said loosely fitted information-carrying member at a given relative angular position to said secured information-carrying member, and permitting said loosely fitted information-carrying member to rotate relatively to said secured information-carrying member in either of forward and reverse directions from said given angular position within each predetermined angular range,

blocking means for temporarily prohibiting the rotation of said loosely fitted information-carrying member in timed relation to the rotation of said main shaft, and

drive control means responsive to control signals applied thereto for sequentially driving said step motor so as to rotate said secured information-carrying member in timed relation with the rotation of said main shaft within the predetermined angular range with said loosely fitted information-carrying member being prohibited of rotation, whereby said first and second information-carrying members are rotated with a substantially fixed phase difference by said single step motor in timed relation with the rotation of said main shaft.

4,186,676

APPARATUS FOR FORMING A CHAIN OF STITCHES ON DOUBLE NEEDLE SEWING MACHINES

Enrico Villa, and Angelo Radice, both of Milan, Italy, assignors to Rockwell-Rimoldi, S.p.A., Milan, Italy

Filed Apr. 3, 1978, Ser. No. 892,572

Claims priority, application Italy, Apr. 28, 1977, 22905 A/77

Int. Cl.[2] D05B *1/10, 27/04, 47/04*

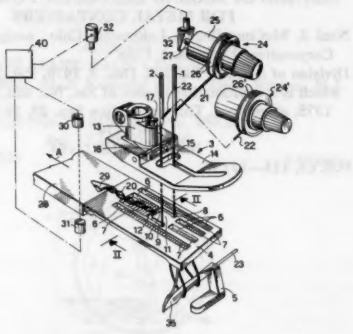
U.S. Cl. 112—165 **1 Claim**

1. A device for forming a continuous chain of stitches between pieces of material on a sewing machine of the type having a feed dog and pressor foot with two needles drawing their thread from independent sources through separate tensioning devices and a needle plate forming a portion of the machine's sewing area with a single looper having an independent thread source disposed beneath the needle plate, said device comprising:

(a) means mounted on the sewing machine for releasing the tension on the thread of one of the needles;

(b) means operatively connected to said releasing means for sensing the presence of material in the sewing area and for actuating said releasing means upon detection of the absence of material in the sewing area, including:

(i) a source of light defining a lamp (30); and



(ii) a photo-electric cell (31) spaced from and in alignment with said lamp (30) adjacent the sewing area of the machine;

(c) a cross member forming an integral part of the needle plate for receiving the chain of stitches formed by the tensioned threads of the other needle and looper; and

(d) an auxiliary feed member mounted in the presser foot in operative association with the feed dog and said cross member for advancing the chain of stitches formed by the tensioned needle and looper threads.

4,186,677

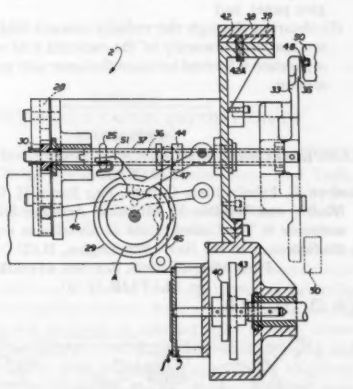
AUTOMATIC COLOR BOBBIN CHANGER

Alfred D. Sacchetti, 1903 Sharon Rd., Meadowbrook, Pa. 19046

Filed May 8, 1978, Ser. No. 903,439

Int. Cl.[2] D05B *57/26*

U.S. Cl. 112—186 **8 Claims**



1. An automatic bobbin changer for attachment to a sewing machine, said bobbin changer serving to detach from the sewing machine a first bobbin case having a latch, said bobbin changer involving grasping means constituting first and second grasping fingers, means to open and close said grasping fingers,

means to move said grasping fingers between said sewing machine and a storage area, said storage area being comprised of a plurality of cartridges for storing full and empty bobbin cases, said grasping means grasping said bobbin latch, and means to move said grasping means away from said sewing machine whereby said grasping means hold said bobbin cases and carry away said bobbin cases from said sewing machine.

4,186,678

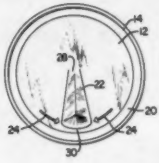
METHOD OF MAKING EASY-OPEN, PUSH-TAB END FOR METAL CONTAINERS

Neal J. McConnellogue, Lakewood, Colo., assignor to Entech Corporation, Englewood, Colo.

Division of Ser. No. 747,100, Dec. 3, 1976, Pat. No. 4,127,213, which is a continuation-in-part of Ser. No. 623,758, Oct. 20, 1975, abandoned. This application Sep. 29, 1978, Ser. No. 947,034

Int. Cl.[2] B21D *51/44*

U.S. Cl. 113—121 C **5 Claims**



1. A method of forming a convenience opening in a container lid comprising the steps of:

(1) providing a sheet of metal to form an end closure having a central panel and outer surrounding rim,

(2) deforming a portion of the central panel in an axial direction away from the plane of the central panel to form an inner offset gate panel and axially directed wall section interconnecting the inner gate panel and central panel,

(3) applying an axially directed force in the opposite direction to said inner gate panel whereby to form an elongated medial rib therein,

(4) folding by axially compressing the wall section while flattening the rib of the inner panel to cause said wall section to be compressed into a tightly folded bead which undergoes a first radially outward reversal from the central panel into a radially inward reversal into the inner gate panel, and

(5) shearing through the radially inward fold of the wall section just outwardly of the outward fold until a line of separation is formed between the inner gate panel and wall section.

4,186,679

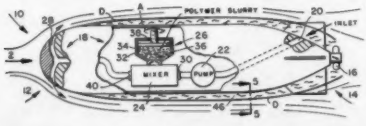
TORPEDO DRAG REDUCTION EMPLOYING POLYMER EJECTION

Andrew G. Fabula, State College, Pa.; James H. Green, Sierra Madre, and William F. Madison, Arcadia, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 17, 1965, Ser. No. 441,002

Int. Cl.[2] F42B *19/00*

U.S. Cl. 114—20 R **6 Claims**



6. A method for reducing skin friction drag associated with high Reynolds-number turbulent flows adjacent the surface of a torpedo, said torpedo being of a type having an elongated body and adapted to be self propelled through the water, said method comprising the steps:

(a) ingesting a continuous flow of ambient seawater,

(b) adding to the flow of ingested seawater a quick solvation, polymer-amorphous suspension mixture, said mixture containing a powdered form of hydrodynamic drag reducing water soluble polymer material having a high molecular weight and a linear, long-chain, molecular structure, and containing a quick solvation suspending medium, said mixture added to the seawater at a predetermined rate to produce a concentration of polymer material in the flow between the limits 0.05% and 1.0%, by weight,

(c) mixing the seawater and additive mixture to produce a seawater-polymer solution flow in which the polymer material is present in substantially solvated and hydrated form, and in a manner in which the solvated and hydrated form of polymer molecules retain their linear, long-chain, molecular structure,

(d) ejecting the seawater-polymer solution from the nose of the torpedo with a component of ejection motion in the direction of flow of the adjacent ambient stream to cause the solution to be swept rearwardly along the torpedo in intimate contact with its exterior surface under torpedo forward motion.

4,186,680

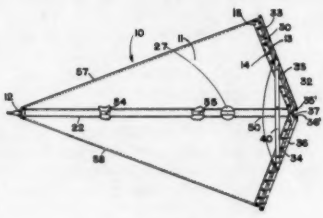
SAIL ASSEMBLY

George B. Harpole, 3905 Rolling Hill Dr., Middleton, Wis. 53593

Filed Jan. 24, 1978, Ser. No. 871,805

Int. Cl.[2] B63H *9/06*

U.S. Cl. 114—103 **5 Claims**



1. A sail assembly comprising,

a. a sail,

b. a mast disposed substantially coincident with one diagonal of said sail,

c. a brace cruciform with said mast, said brace being non-pliant, shorter, and disposed non-coincident with one cross diagonal of said sail, and wherein the end extremities of said brace are configured with groove-like recesses,

d. latch means for adjustably securing said mast to said brace,

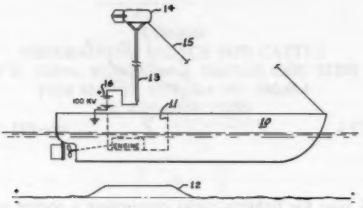
e. relatively non-pliant spars, disposed individually along two edges of said sail which form a common juncture with said one diagonal, said spars being moveably retained upon either end extremity of said brace in said groove-like recesses, said brace urging said spars outward for deploying said sail, said sail being fixed to said spars and anchored to the foot of said mast.

4,186,681

PROTECTION AGAINST INFLUENCE MINES

Oliver H. Gish, Fort Pierce, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 12, 1963, Ser. No. 330,198
Int. Cl.[2] B63G *9/00*
U.S. Cl. 114—240 R **5 Claims**



1. Apparatus for decreasing the intensity of cosmic rays at a selected distance beneath a relatively empty displacement volume in an otherwise uniformly loaded ship floating on a body of water comprising in combination,

a ship having a relatively empty displacement volume, and

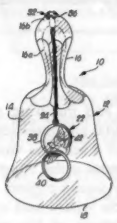
means for establishing in vertical alinement with said volume a charged particle deflecting field having a strength and configuration effective to divert from a region at said selected distance directly beneath said volume a major fraction of the charged particles which would be prevented from reaching said region by absorption in water displaced by said volume.

4,186,682

BELL AND CLAPPER ASSEMBLY

Ronald W. Longsdorf, Kansas City, Mo., and Clifford P. Cutler, Overland Park, Kans., assignors to Hallmark Cards, Incorporated, Kansas City, Mo.

Filed Nov. 17, 1978, Ser. No. 961,655
Int. Cl.[2] G10K *1/06*
U.S. Cl. 116—171 **8 Claims**



1. A bell and clapper assembly comprising:

a bell housing provided with a barrel and sound bow of transparent material of a thickness and physical characteristics to vibrate and give a ringing sound when struck;

a hollow handle extending from the barrel in a direction substantially opposite said sound bow of the housing and communicating with the interior of the barrel,

said handle being provided with an opening in the outer extremity thereof remote from the barrel;

an ornamental clapper having an aesthetic, distinctive appearance representative of a particular motif;

an elongated flexible support element for the clapper;

means for suspending the clapper from one end of the support element;

a connector secured to the opposite end of the support element and aligned with said opening in the handle; and

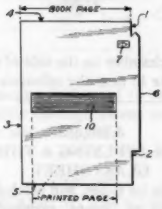
a decorative fastener resting on the handle, extending through said opening and releasably joined to the connector for removable support of the clapper and flexible element from the handle.

4,186,683

BOOK MARK-PAGE LINE-READER

Edward W. LeRoy, 45-25 Kennedy Blvd., North Bergen, N.J. 07047

Filed Nov. 1, 1978, Ser. No. 956,883
Int. Cl.[2] B42D *9/00*
U.S. Cl. 116—235 **2 Claims**



1. A book mark-page line-tired eyes reader, comprising

a sheet of opaque plastic having the shape and dimensions of a book page; and

comprising an arrow cutout shaped in a middle portion of the right edge of said sheet as viewed when a book is opened thereof, pointing to the top or bottom edge to indicate on which half of either page the user interrupted his reading, and a self-adhesive removable arrow label placed on one of the right or left edges on the sheet pointing to the exact line on either page to indicate where the reader interrupted his reading; and means formed on the sheet so as visibly encompass at least one printed line.

4,186,684

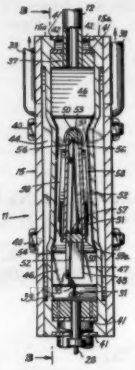
APPARATUS FOR VAPOR DEPOSITION OF MATERIALS

Joseph Intrater, 125 Demarest Ave., Englewood Cliffs, N.J. 07632, and Ralph Gorman, 700 Columbus Ave., New York, N.Y. 10025

Filed Jun. 1, 1977, Ser. No. 802,469
Int. Cl.[2] C23C *13/08*
U.S. Cl. 118—725 **6 Claims**

1. Apparatus for performing vapor deposition processes on a substrate, comprising a central housing having a centrally located reaction chamber formed therein, said housing having a pair of opposed openings in opposed sides thereof, cover plate means removably secured to said housing for closing said opening, said cover plate means defining coolant chambers therein; means for supplying and exhausting reaction gases from the reaction chamber; said housing including means for defining at least one additional coolant chamber therein about a portion of the periphery of the reaction chamber between said cover plate means; means for supplying and exhausting coolant to and from said coolant chambers; support means in

said reaction chamber for supporting a substrate thereon upon which vapor deposition is to occur; and means for supplying



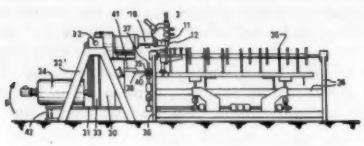
heat in said reaction chamber on the side of said support means opposite said substrate to heat the substrate.

4,186,685

APPARATUS FOR APPLYING A THICK SEAL TO A GLASS SHEET

Pierre Chenel, Enghien les Bains, and Michel Moncheaux, Chalon sur Saone, both of France, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Continuation of Ser. No. 639,787, Dec. 11, 1975, abandoned. This application Nov. 18, 1977, Ser. No. 852,810
Claims priority, application France, Dec. 11, 1974, 74 40824
Int. Cl.[2] C03C *27/10*; B05C *3/18, 3/20*
U.S. Cl. 118—410 **5 Claims**



1. An apparatus for applying a plastic filament along a line onto the periphery of a face of a glass sheet which is adapted for use in the production of a multiple window pane unit, said apparatus comprising in combination:

(a) an extrusion device having an extrusion nozzle for extruding a plastic material on the glass sheet;

(b) support means defining a surface for supporting the glass sheet;

(c) said extrusion nozzle being situated in spaced relation above the supported glass sheet and disposed in a plane extending through the line along which the plastic material is to be applied;

(d) said extrusion device including a body portion and head member disposed along a predetermined axis extending transversely to the plane in which the nozzle is disposed;

(e) said head member being rotatably mounted on the body portion for rotation about said predetermined axis for selectively positioning the nozzle at a variable angle with respect to the plane of the sheet; and

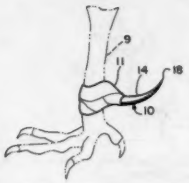
(f) means operatively connected to said body portion for vertically adjusting the body portion, head member and nozzle relative to the plane of the sheet onto which the plastic material is applied to position the nozzle at a vertical height related to the angle of the nozzle and the thickness of the plastic material being applied to the glass sheet.

4,186,686

PROSTHETIC SPUR FOR FIGHTING COCKS

Silverio Hernandez, Philadelphia, Pa., assignor to Conquest Manufacturing Co., Inc., Philadelphia, Pa.

Filed Oct. 25, 1977, Ser. No. 844,970
Int. Cl.[2] A01K *45/00*
U.S. Cl. 119—1 **5 Claims**



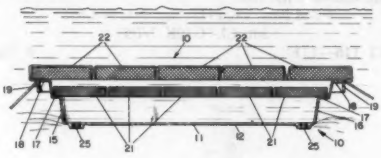
3. A spur for fighting cocks comprising a socket portion providing a cavity adapted to fit on the existing stump of a fighting cock where its natural spur would grow, and a pointed portion extending from said socket portion in a tapered arcuate configuration, said pointed portion terminating in a point at the end thereof opposite said socket portion, said spur being made of a light weight aluminum, said cavity extending approximately the entire depth of said socket portion for fitting a relatively long stump, said pointed portion having a radius of curvature of approximately one and one-half to one and five-eighths inches.

4,186,687

METHOD FOR GROWING OYSTERS AND OTHER MOLLUSCS

Donald S. Gilpatric, 4304 Gifford Pinchot Dr., Annandale, Va. 22003

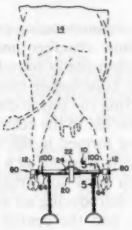
Filed Jul. 18, 1978, Ser. No. 925,765
Int. Cl.[2] A01K *61/00*
U.S. Cl. 119—4 **5 Claims**



1. A method for rearing and maturing oysters from seed stocks in natural bodies of tidal and intertidal water, comprising placing young oysters of a selected size taken from seed stock in a first set of foraminous cribs, supporting the first set of foraminous cribs with the young oysters therein on a shelf within an open-top receptacle where said oysters are protectively housed above the bottom of the receptacle, placing oysters of a selected larger size than said young oysters taken from seed stock in a second set of foraminous cribs, supporting said second set of foraminous cribs with said larger oysters therein across the open top of said receptacle above said first set of cribs and securing said second set of cribs to said receptacle, lowering said receptacle with said first and second sets of cribs onto the bottom of a natural body of tidal and intertidal water where the waters will flow over said receptacle and through said cribs to supply food and nutrients to the oysters contained therein, keeping said receptacle with its cribs of oysters supported thereon on the bottom of the body of water for a predetermined growth period until the oysters have grown a desired amount, and periodically raising said receptacle with its cribs of oysters to the surface of the water, where the oysters in said second set of cribs are culled, and mature

oysters of above a predetermined size are removed therefrom for use or sale, and the oysters in said first set of cribs are culled, and oysters above a selected size which are not yet mature are removed and placed in said second set of cribs, and young oysters of a selected size taken from seed stock are placed in said first set of cribs to replace the oysters of a larger size removed therefrom, and lowering the receptacle with its cribs of oysters again to the bottom of the body of water for another growth period.

4,186,688
RESTRAINING DEVICE FOR CATTLE
Edward W. Gaitan, 9129 Houston, Hanford, Calif. 93230
Filed Mar. 27, 1978, Ser. No. 890,694
Int. Cl.[2] A01K *15/00*
U.S. Cl. 119—96 **2 Claims**



2. An improved restraining device particularly suited for use in treating a cow lying on the ground in a prone position comprising:

A. an elongated bar including a pair of telescopically related segments, and locking means for releasably securing said segments in a mutually fixed relationship;

B. a pair of cuffs adapted to receive in confining relation hocks of a cow, and swivel means interconnecting the cuffs of the pair with the opposite ends of the bar;

C. means for securing said bar against displacement relative to the cow including a pair of eyes welded to said bar and a pair of spikes extended therethrough into a penetrating relationship with the ground, and a pair of stirrups suspended from the bar adapted to receive a pair of human feet; and

D. means for mounting on said bar a tongue of a calf-pulling mechanism.

4,186,689
ANIMAL SLING
John T. Alexander, 616 Mount Lebanon Rd., Wilmington, Del. 19803, and John D. Heppner, 83 Doe Run Dr., Holland, Pa. 18966
Filed Oct. 17, 1977, Ser. No. 842,792
Int. Cl.[2] A61D *3/00*
U.S. Cl. 119—102 **10 Claims**

1. An animal sling for use with a hoist on large four legged animals which comprises

sternum abdominal panel means having connecting end panels disposed above the body of the animal for connection to a hoist,

a T-shaped member which comprises two panels connected together in a "T" configuration,

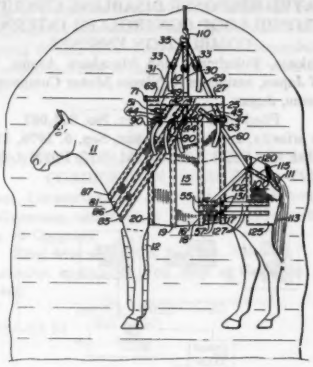
one of said panels conforming to the shoulders or neck of the animal and the other of said panels being connected to a side margin of said sternum abdominal panel means,

separately adjustable strap means carried by said one of said panels of said T-shaped member for securing said one of said panels to said end panels,

converging adjustable supporting straps extending upwardly from said end panels for connection to a hoist,

a tail piece for engagement with the rump of the animal in restraining relation thereto,

strap means including horizontally extending strap members connecting said tail piece to said sternum abdominal panel means, and



adjustable strap means connected to said abdominal panel means and slidable through means on said tail piece and connected with said end panels.

4,186,690
ANIMAL GROOMING TETHERING DEVICE
John J. Seiler, 10414 E. Jefferson Rd., Osceola, Ind. 46561
Filed Dec. 5, 1977, Ser. No. 857,402
Int. Cl.[2] A01K *1/06*
U.S. Cl. 119—110 **9 Claims**

1. An animal grooming tethering device comprising a one-piece clip having two resilient wire-like, generally parallel arms and a means connecting said arms at one end thereof, at least one of said arms having an end member on the free end thereof extending inwardly toward the other arm to form a yieldable restriction, a ring-like means extending partially around said restriction and between said arms for engagement with said end member at said restriction, said ring-like means being releasably retained by said end member, a band-like adjustable element of a generally oval shape slidable longitudinally on said arms for varying the force required to displace said end member and to thereby release said ring-like means through said restriction, a member connected to one of said

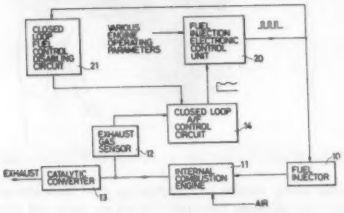
means for supporting said clip, and a leash connected to the other of said means for restraining an animal for grooming.

4,186,691

DELAYED RESPONSE DISABLING CIRCUIT FOR CLOSED LOOP CONTROLLED INTERNAL COMBUSTION ENGINES

Sadao Takase, Yokohama, and Masaharu Asano, Yokosuka, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sep. 6, 1977, Ser. No. 831,061
Claims priority, application Japan, Sep. 6, 1976, 51/105847
Int. Cl.[2] F02B *3/08*; F02M *7/12*; F01N *3/08*
U.S. Cl. 123—32 EL **13 Claims**



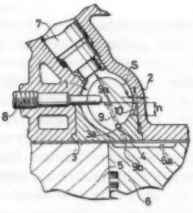
8. A fuel control system for controlling the ratio of an air fuel mixture supplied to an internal combustion engine, comprising exhaust gas sensor means for deriving a control signal for the air fuel mixture, a fuel controller responsive to the air fuel mixture control signal for controlling the amount of fuel supplied to the engine, said fuel controller being activated to reduce the supply of fuel to the engine in response to an engine parameter indicative of deceleration, said control signal having a first amplitude condition during deceleration to indicate that the mixture has been leaned and having a tendency to activate the controller to enrich the mixture, whereby an excessively rich mixture has a tendency to be supplied by the controller to the engine at the instant fuel is resupplied to the engine, and means for decoupling the control signal from the fuel controller in response to the fuel controller being commanded by the deceleration parameter to reduce the flow of fuel for at least a predetermined interval.

4,186,692

COMPRESSION IGNITION INTERNAL COMBUSTION ENGINE WITH AUXILIARY SWIRL COMBUSTION CHAMBER

Hideo Kawamura, Yamato; Kimi Kubota, Chigasaki, and Hideo Ohta, Kanagawa, all of Japan, assignors to Isuzu Motors Limited, Kawasaki, Japan

Filed Apr. 28, 1978, Ser. No. 901,156
Claims priority, application Japan, Jan. 13, 1978, 53-3137
Int. Cl.[2] F02B *3/00*
U.S. Cl. 123—32 L **3 Claims**



1. A compression ignition internal combustion engine having a piston, associated cylinder, a cylinder head and a fuel injection nozzle, comprising:

(a) a primary combustion chamber defined by the piston, associated cylinder and cylinder head,

(b) an auxiliary swirl combustion chamber having a wall on which fuel from said injection nozzle impinges, an upper half of said auxiliary swirl combustion chamber being formed in the cylinder head and a lower half of said auxiliary swirl combustion chamber being formed by a swirl chamber forming member, said swirl chamber being substantially in the form of a sphere,

(c) a primary communicating passage connecting the primary combustion chamber and the auxiliary swirl chamber for indroducing compressed air from the primary combustion chamber to the auxiliary swirl chamber during the compression stroke of the piston and thereby forming a main swirl along the inner periphery of the swirl chamber,

(d) a pair of second communicating passages connecting the primary combustion chamber and the auxiliary swirl chamber for supplementally introducing compressed air from the primary combustion chamber to the auxiliary swirl chamber during the piston compression stroke, said passages being directed to the central portion of the swirl chamber and being formed in the side walls of the swirl chamber so as to introduce air in a direction substantially normal to the main swirl flow from opposite sides of the swirl chamber for introducing air under a small influence of the swirl flow into the central portion of the swirl chamber, and

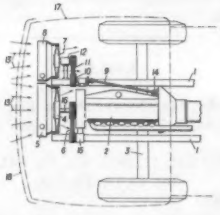
(e) a recess portion being provided in the wall onto which the fuel is injected to thereby produce a plurality of small swirls.

4,186,693

WATER-COOLED INTERNAL COMBUSTION ENGINE FOR MOTOR VEHICLES, PARTICULARLY A DIESEL ENGINE

Gerhard Thien, and Heinz Fachbach, both of Graz, Austria, assignors to Hans List, Graz, Austria

Filed Jul. 21, 1977, Ser. No. 817,857
Claims priority, application Austria, Jul. 21, 1976, 5373/76
Int. Cl.[2] F01P *3/18, 3/20, 7/12*
U.S. Cl. 123—41.12 **7 Claims**



1. An internal combustion engine with reduced noise level cooling system for a motor vehicle which comprises

a water cooled internal combustion engine mounted on the frame of the motor vehicle, said engine having a drive shaft extending therethrough;

a first cooling unit mounted directly in front of said engine, said first cooling unit including a first radiator through which cooling water from said engine passes and a first fan mounted for rotation between said first radiator and said engine;

drive means mechanically connecting said first fan with said drive shaft so as to rotate same, said drive means including a first temperature-sensitive transmission device which allows said drive shaft to rotate said first fan when the

cooling water flowing through said engine and said first cooling unit exceeds a first predetermined temperature;

a second cooling unit mounted adjacent said first cooling unit, said second cooling unit including a second radiator through which cooling water from said engine passes and a second fan, said second radiator and second fan having smaller dimensions than said first radiator and first fan, respectively; and

auxiliary means mechanically connecting said second fan with said engine so as to rotate said second fan, said auxiliary means including a second temperature-sensitive transmission means which allows said engine to rotate said second fan only when a second predetermined temperature of said cooling water passing through said engine and said second cooling unit is exceeded, i.e., when said first cooling unit is inadequate to dissipate heat generated by said engine, said first cooling unit being capable of dissipating at least 60% of the maximum heat output of said engine.

4,186,694

TEMPERATURE CONTROL SYSTEM OF AN ENGINE EXHAUST GAS COMPONENT SENSOR

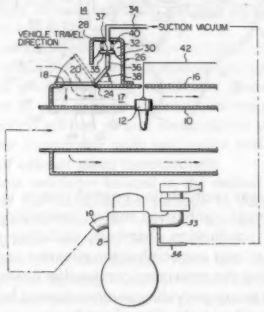
Shyushi Koseki, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed May 25, 1977, Ser. No. 800,328

Claims priority, application Japan, May 27, 1976, 51-67006

Int. Cl.[2] F01P *1/06, 3/12*

U.S. Cl. 123—41.31 **10 Claims**



1. A temperature control system in combination with an internal combustion engine including:

means defining an intake passageway for conducting atmospheric air to the engine,

means defining an exhaust gas passageway for conducting exhaust gases of the engine to the atmosphere, and

an exhaust gas component sensor fixedly secured to the exhaust gas passageway defining means for sensing the concentration of a component contained in the engine exhaust gases which concentration is closely related to an air-fuel ratio,

said temperature control system comprising a jacket which surrounds the exhaust gas passageway defining means at a portion equipped with the exhaust gas component sensor and which is spaced from the exhaust gas passageway defining means to define an air chamber therebetween, said jacket having an air inlet which opens from the atmosphere into said air chamber for admitting thereinto atmospheric air for cooling the exhaust gas component sensor,

a flow control valve for controlling said air inlet,

means defining a vacuum chamber which communicates with the intake passageway for receiving a suction vacuum of the engine therefrom,

a pressure responsive partition having at a side thereof said vacuum chamber and arranged movably in response to the vacuum in said vacuum chamber, said pressure responsive partition being so operatively connected to said flow control valve that said partition causes said flow control valve to close said air inlet in response to said vacuum chamber above a predetermined value and that said partition causes said flow control valve to open said air inlet in response to a vacuum in said vacuum chamber below said predetermined value and increases and reduces the degree of opening of said flow control valve in accordance with decrease and increase in the vacuum in said vacuum chamber.

4,186,695

INTAKE-TUBE ARRANGEMENT FOR INTERNAL COMBUSTION ENGINES

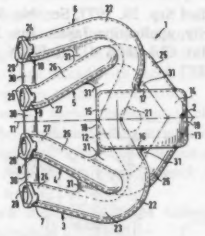
Jurij Gartner, Germering, and Jiri Seidl, Munich, both of Fed. Rep. of Germany, assignors to Bayerische Motoren Werke, Fed. Rep. of Germany

Filed Mar. 13, 1978, Ser. No. 885,988

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1977, 2736466

Int. Cl.[2] F02B *75/20*

U.S. Cl. 123—52 M **3 Claims**



1. Intake-pipe arrangement for internal combustion engines, comprising:

an intake manifold,

and intake pipes of approximately equal length and located pairwise from opposite sides of said intake manifold wherein said intake pipes are in communication with one another via said intake manifold,

wherein the ends of the respective opposite intake pipes are connected diagonally with respect to one another to the intake manifold, wherein imaginary extensions of the ends of said intake pipes extending into the intake manifold intersect, the distance between the intersections of said extensions being greater than the distance between the connections of said ends of said intake pipes to their respective side of said manifold.

4,186,696

PUSH RODS AND THE LIKE

Don R. Linsenmann, Westfield, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Jan. 31, 1978, Ser. No. 873,938

Int. Cl.[2] F01L *1/14*

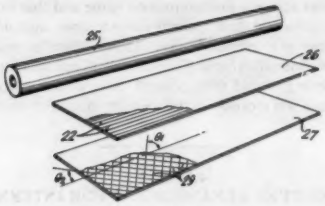
U.S. Cl. 123—90.61 **7 Claims**

1. A push rod comprising:

a tubular body portion having a central core and an exterior sheath, said core being a fiber reinforced tubular resin member, said fibers being continuous unidirectional reinforcing fibers selected from carbon and graphite, said fibers being oriented at substantially 0° with respect to the longitudinal axis of said body portion, and

said exterior sheath being a sheath of resin impregnated continuous unidirectional fibers integral with and disposed on said core, said fibers being oriented at between about ±40° and ±60° with respect to the longitudinal axis

of said body portion, said fibers in said exterior sheath being selected from fibers having a tensile strength of



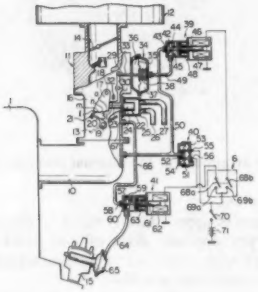
greater than about 250,000 psi and a modulus greater than about 9,000,000 psi.

4,186,697

EXHAUST GAS PURIFICATION PROMOTING DEVICE

Yushiro Yasuda, and Hironori Bessho, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Sep. 28, 1977, Ser. No. 837,098
Claims priority, application Japan, Jun. 20, 1977, 52-72196
Int. Cl.[2] B60K *41/18*; F02N *17/00*
U.S. Cl. 123—117 A **20 Claims**



1. An exhaust gas purification promoting device of an internal combustion engine having a starting means, a carburetor with a throttle valve in its intake passage, a distributor having a vacuum advance mechanism, an exhaust gas purifier in its exhaust system and a transmission with a shift gear, said device comprising:

means for temporarily maintaining the throttle valve at a predetermined first opening degree when the temperature of the engine is lower than a predetermined first level;

means for detecting the gear position of the gear shift to provide a signal indicating that the gear shift is shifted from neutral into a gear;

means for actuating said maintaining means to release the holding operation of the throttle valve and return the throttle valve to a second opening degree, which is smaller than said first opening degree, in response to said signal when the gear shift is shifted from neutral;

a vacuum operated switch for producing a first operating signal indicating that the engine is being rotated by the starting means and a second operating signal indicating that the engine is operating by its own power;

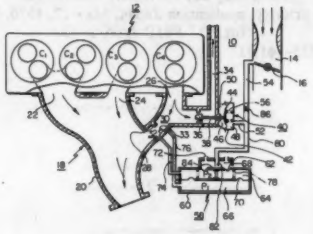
a vacuum control valve for controlling the vacuum level in the vacuum advance mechanism for advancing the ignition timing in response to the first operating signal from said switch during the time the engine is being rotated by the starting means, for retarding the ignition timing in response to the second operating signal from said switch during the time the engine is warming up and the gear shift is in neutral, and for advancing the ignition timing in response to the signal from the detecting means when the gear shift is shifted into gear and the engine is warming up.

4,186,698

ENGINE EXHAUST GAS RECIRCULATION CONTROL SYSTEM

Syunichi Aoyama, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Nov. 16, 1977, Ser. No. 851,954
Claims priority, application Japan, Nov. 19, 1976, 51-139871
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **15 Claims**



1. An exhaust gas recirculation control system in combination with an internal combustion engine, comprising:

a plurality of combustion chambers, including a first set comprising at least one combustion chamber and a second set comprising the remaining combustion chambers;

intake passage means providing communication between the atmosphere and said plurality of combustion chambers for conducting air thereinto;

branched exhaust gas passage means for conducting exhaust gases emitted from the engine to the atmosphere, including a first branch communicating with said first set of combustion chambers and a second branch communicating with said second set of combustion chambers;

a restriction dividing said first branch into upstream and downstream sections, said upstream section being closer to said first set of combustion chambers than said downstream section; and means for controlling exhaust gas recirculation to said combustion chambers, comprising:

an exhaust gas recirculation (EGR) passageway providing communication between said upstream section and said intake passage means;

an EGR control valve disposed in said EGR passageway;

a source of fluid pressure;

means, responsive to vacuum produced in said intake passage means, for opening and closing said EGR control valve to control the rate of exhaust gases recirculated; and

means, responsive to at least the pressure of exhaust gases in said upstream portion of said first branch of the exhaust gas passage means, for controlling the vacuum supplied to said valve opening and closing means by selectively supplying to said valve opening and closing means fluid pressure from said fluid pressure source.

4,186,699

EXHAUST GAS RECIRCULATION SYSTEM

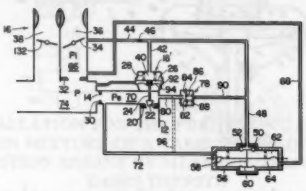
Syunichi Aoyama, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Feb. 7, 1978, Ser. No. 875,819

Claims priority, application Australia, Mar. 27, 1973, 53800/73; Fed. Rep. of Germany, Oct. 17, 1974, 2449431; May 15, 1975, 2521681; Japan, Feb. 8, 1977, 52-12048; Aug. 12, 1977, 52-96121

Int. Cl.[2] F02M *25/06*

U.S. Cl. 123—119 A 11 Claims



1. An exhaust gas recirculation system in an internal combustion engine comprising

an induction passage with a throttle valve therein for controlling air flow therethrough to the engine;

an exhaust passage;

an exhaust gas recirculation passage having a first portion leading from said exhaust passage and a second portion extending to said induction passage downstream of said throttle valve;

an exhaust gas recirculation flow control valve including a valve seat arranged in said exhaust gas recirculation passage to permit the flow of exhaust gases from the first portion of said exhaust gas recirculation passage toward the second portion of said recirculation passage, a valve member cooperable with said valve seat to control the flow of exhaust gases therethrough;

a first flow restrictor located in the second portion of said exhaust gas recirculation passage to define a first zone between said first flow restrictor and said valve seat;

a second flow restrictor located in said induction passage downstream of said throttle valve and upstream of a discharge port opening to said air induction passage to which said exhaust gas recirculation passage leads so as to define a second zone between said second flow restrictor and said throttle valve; and

control mechanism operable to maintain a difference between a first pressure in said second zone and a second pressure in said first zone at a predetermined magnitude, including a first spring biasing said valve member into engagement with said valve seat, a pressure responsive member connected to said valve member, a chamber in communication by way of a first and a second opening with induction vacuum downstream of said throttle valve and with atmosphere respectively, so as to develop in said chamber a control pressure which is applied to said pressure responsive member, a bleed valve associated with one of said openings so as to control flow therethrough and regulate said control pressure, a pressure responsive device connected to said bleed valve and operable in response to increased difference between said first and second pressure to displace said bleed valve and decrease said control pressure and enable said pressure responsive member to overcome the bias of said first spring and displace said valve member to increase recirculation of exhaust gases, and a second spring arranged so as to bias said bleed valve to increase said control pressure upon a decrease in difference between said first and second pressure and enable said first spring to displace said valve member towards said valve seat and decrease the recirculation of exhaust gases.

4,186,700

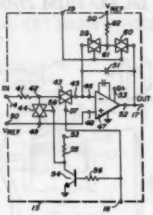
LOW LEAKAGE INTEGRATOR FOR CARBURETOR CONTROL

Liviu Stoian, Arlington Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 1, 1978, Ser. No. 939,295

Int. Cl.[2] F02B *3/00*

U.S. Cl. 123—119 EE 14 Claims



9. A carburetor control system comprising:

adjustable carburetor means for controlling the air to fuel mixture for an engine;

sensor means for providing an input signal at a terminal wherein the magnitude of said input signal is related to the percentage of oxygen mixed with fuel by said carburetor;

a low leakage integrator circuit comprising:

amplifier means having input, output and reference terminals, said amplifier means including structure for receiving signals at said input and reference terminals and producing at said output terminal an output signal related to the amplified input signal;

capacitive feedback means connected between said input and output terminals;

first controllable gate means having first and second through terminals and a control terminal, said second terminal coupled to said input terminal, said first gate means selectively providing open and short circuits between said first and second terminals in accordance with the magnitude of the signal at said control terminal;

second controllable gate means having first and second through terminals and a control terminal, said first terminal of said second gate means coupled to said first terminal of said first gate means and said second terminal of said second gate means coupled to a terminal having substantially the same potential as said reference terminal, said second gate means selectively providing open and short circuits between said first and second terminals of said second gate means in accordance with the magnitude of the signal at said second gate means control terminal; and

control circuit means for producing first and second control signals coupled to said first gate means and second gate means control terminals, respectively, for complimentary operation of said first and second gate means, whereby with said first gate means as a short circuit an input signal can be applied through said first gate means to produce an integrated output signal at said output terminal, and with said first gate means as an open circuit the signal at said output terminal remains constant and said second gate means minimizes any leakage across said first gate means by providing a very low voltage difference across said first gate means;

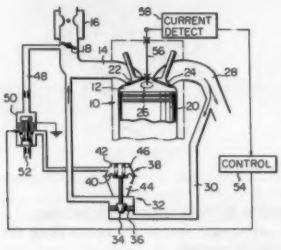
means coupling said sensor input signal to said amplifier means input terminal; and

means coupled to said amplifier means output terminal and said carburetor means for controlling the mechanical setting of said carburetor to adjust the carburetor controlled fuel mixture in accordance with the magnitude of the signal at said output terminal.

4,186,701
FEEDBACK CONTROL OF EXHAUST GAS RECIRCULATION BASED ON COMBUSTION CONDITION

Suzuo Suzuki, Yokosuka; Yoshitaka Hata, Fujisawa, and Akihiro Ohnishi, Koshigaya, all of Japan, assignors to Nissan Motor Company Limited, Yokohama, Japan

Filed Aug. 16, 1977, Ser. No. 825,130
Claims priority, application Japan, Aug. 23, 1976, 51-100434
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **3 Claims**



1. A feedback control system for controlling the volume of exhaust gas recirculated from an exhaust passage of an internal combustion engine to the induction passage of the engine through an exhaust recirculation passage, the system comprising:

a flow control valve to vary the volume flow rate of the exhaust gas in the exhaust recirculation passage;

a sensor means for sensing the condition of combustion in a combustion chamber of the engine and producing a first electrical signal representing the sensed combustion condition, said sensor means comprising a probe inserted into said combustion chamber to produce an ionic current in said combustion chamber when combustion occurs therein and to direct the intensity of said ionic current;

a control means for producing a second electrical signal based on said first electrical signal, said second electrical signal indicating a decrease in the volume flow rate of the exhaust gas in the recirculation passage when said first electrical signal implies a decrease in the intensity of said ionic current corresponding to an unstable combustion condition in said combustion chamber; and

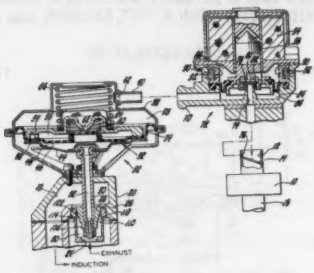
an actuator means for operating said control valve in response to said second electrical signal.

4,186,702
EXHAUST GAS RECIRCULATION CONTROL

Edward G. Day, Rochester, and Thomas J. Hollis, Jr., Fairport, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 2, 1978, Ser. No. 911,810
Int. Cl.[2] F02B *25/06*
U.S. Cl. 123—119 A **3 Claims**

1. An exhaust gas recirculation control assembly for an engine having an induction passage for induction air flow and a recirculation passage for exhaust gas recirculation to said induction passage, said assembly comprising a diaphragm defining a portion of an operating pressure chamber, said chamber having an aperture for sensing a subatmospheric pressure signal and also having an air bleed and combining the pressures sensed through said aperture and said air bleed to form an operating pressure, a control valve in said recirculation passage and positioned by said diaphragm to produce an exhaust gas recirculation area in inverse relation to said operating pressure, and a valve varying flow through said bleed to create an operating pressure for positioning said control valve to provide exhaust gas recirculation in accordance with engine operating conditions, and wherein the improvement comprises means defining a signal chamber having ports for sensing subatmospheric pressure in said induction passage and atmospheric pressure and combining the pressures sensed through said ports to create said subatmospheric pressure signal, regulating valve means modulating said ports for preventing said signal from dropping below a lower limit to thereby establish

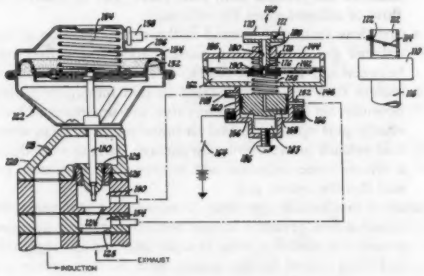


a maximum exhaust gas recirculation area, and means for varying said lower limit and thus said maximum area to thereby decrease the proportion of exhaust gas recirculation to induction air flow when induction air flow exceeds a selected rate.

4,186,703
EXHAUST GAS RECIRCULATION CONTROL

Raymond J. Haka, Rochester, Mich., and Donald D. Stoltman, Henrietta, N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 6, 1978, Ser. No. 940,079
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **5 Claims**



1. An exhaust gas recirculation control assembly for an engine having an induction passage for induction air flow and a recirculation passage for exhaust gas recirculation to said induction passage, said assembly comprising a control diaphragm subjected to a reference pressure, a spring exerting a force on said diaphragm contributing to said reference pressure, said diaphragm defining a portion of a control pressure chamber sensing the pressure in a zone in said recirculation passage, a valve for regulating an operating pressure in response to a deviation of the pressure sensed by said chamber from said reference pressure, and a control valve in said recirculation passage for permitting exhaust gas recirculation in accordance with said operating pressure to provide exhaust gas recirculation at rates which maintain the pressure sensed by said chamber equal to said reference pressure, and wherein the improvement comprises a switchimg member which at one time causes said chamber to sense the pressure in one zone in said recirculation passage and causes said spring to exert one force on said diaphragm and at other times causes said chamber

to sense the pressure in another zone in said recirculation passage and causes said spring to exert another force on said diaphragm, whereby exhaust gas recirculation is provided as a proportion of induction air flow with said proportion being higher at said one time than at said other times.

4,186,704

INSTALLATION FOR THE PREHEATING OF THE SUCTION MIXTURE OF A CARBURETOR INTERNAL COMBUSTION ENGINE BY MEANS OF THE EXHAUST GASES THEREOF

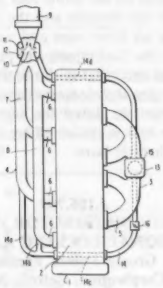
Reiner Bachschmid, Kernen; Gerlinde Gross, Stuttgart, and Wolfgang Strobel, Remshalden, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 12, 1977, Ser. No. 859,701

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1976, 2656448

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 AA **16 Claims**



1. An installation for preheating an intake mixture of a carburetor internal combustion engine, the installation comprising exhaust gas branch line means branching off from an exhaust gas manifold means of an exhaust gas pipe system, the exhaust gas branch line means extends along portions of an intake pipe system in heat-exchange relationship therewith, and a closure valve means for controlling a partial stream of exhaust gas flowing through the exhaust gas branch line means, characterized in that a portion of the exhaust gas pipe system is constructed as a Venturi pipe means of a gas jet pump means, the gas jet pump means having an annular space surrounding the Venturi pipe means, the exhaust gas branch line means is connected with the annular space at a position downstream of the heat exchange portions so as to provide for a suction action of the partial stream of exhaust gas flowing through the exhaust gas branch line means into the remaining exhaust gas stream, the closure valve means is arranged in the exhaust gas branch line means at a position upstream of the heat exchange portions, as viewed in a flow direction of exhaust gas through the exhaust gas branch line means and in that means are provided for cooling at least a portion of the exhaust gas branch line means so as to reduce a thermal loading of the closure valve means.

4,186,705

INSTALLATION FOR THE PREHEATING OF THE SUCTION MIXTURE OF A CARBURETOR INTERNAL COMBUSTION ENGINE

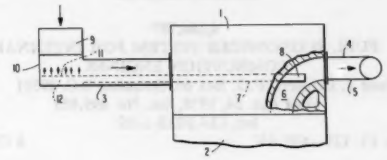
Jorg Abthoff, Pluderhausen; Ludwig Fricker, Stuttgart, and Jurgen Lammer, Korb, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 26, 1978, Ser. No. 872,559

Claims priority, application Fed. Rep. of Germany, Jan. 29, 1977, 2703720

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 AC **6 Claims**



1. An installation for preheating a suction mixture of a carburetor internal combustion engine which includes a cross-flow cylinder head, an exhaust gas line system and a suction pipe system, the installation comprising heat pipe means having a heat-absorption zone and a heat transmission zone, the heat pipe means extends from a portion of the exhaust gas line system to a portion of the suction pipe system, characterized in that the heat pipe means extends through the cross-flow cylinder head to a lower part of a suction pipe of the suction pipe system directly adjoining an outlet of the carburetor, the heat transmission zone includes a flat condenser jacket which partly surrounds a flow channel of the suction pipe from below along a wall surface area thereof while leaving substantially free the main part of the cross-section of the suction pipe.

4,186,706

INDUCTION SYSTEM FOR INTERNAL COMBUSTION ENGINE

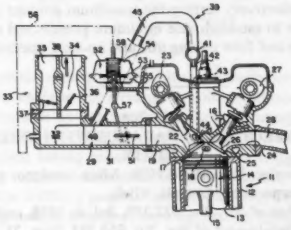
Hiromitsu Matsumoto, Hamamatsu, Japan, assignor to Yamaha Hatsukoki Kabushiki Kaisha, Iweta, Japan

Filed Aug. 29, 1978, Ser. No. 937,711

Claims priority, application Japan, Sep. 9, 1977, 52/108490

Int. Cl.² F02M *13/06*

U.S. Cl. 123—127 **12 Claims**



1. In an internal combustion engine having a variable volume chamber in which combustion occurs, a main intake passage communicating with said chamber through a main intake port for delivering a charge thereto, a sub-intake passage communicating with said chamber through a sub-intake port, said sub-intake passage having an effective cross-sectional area at said sub-intake port substantially less than the effective cross-sectional area of said main intake port for causing a given mass flow of charge through the said sub-intake port to enter the

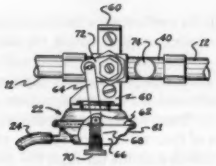
chamber at a substantially greater velocity, a charge forming device for delivering a charge to at least one of said passages, and throttle valve means for controlling the ratio of communication of said ports with said chamber during a given cycle of operation of said engine, said throttle valve means being effective to cause substantially all of the idle load charge requirements of said chamber to be supplied through said sub-intake passage and substantially all of the full load charge requirements of said chamber through said main intake passage, the improvement comprising means for providing at least a portion of the idle charge requirements of said chamber through said main intake passage for reducing the effects of fuel condensation in said passages upon mixture strength.

4,186,707

FUEL ECONOMIZER SYSTEM FOR INTERNAL COMBUSTION ENGINES

Vernon J. Driggers, P.O. Box 64, Scranton, S.C. 29591

Filed Apr. 24, 1978, Ser. No. 899,405
Int. Cl.[2] F02B *1/02*
U.S. Cl. 123—139 AV **8 Claims**



1. In a fuel supply system for an internal combustion engine including a fuel supply tank, a fuel supply line connecting the tank to the fuel inlet of the carburetor of the engine, and a constant pressure fuel pump in the supply line between the tank and the carburetor for delivering fuel to the inlet of the carburetor; the improvement therein comprising a fuel metering valve positioned in the fuel line between the fuel supply pump and the inlet to the carburetor, means for automatically adjusting the metering valve between fully open and only partially closed positions in response to changes in load on the internal combustion engine to reduce the fuel pressure and flow to the inlet to the carburetor during idle and no-load operating conditions on the engine to a minimum preselected amount while progressively increasing the fuel pressure and flow to the carburetor to a maximum flow and pressure in response to increasing load conditions on the engine, and wherein said means for automatically adjusting the metering valve includes means for selectively setting the maximum amount of closure of said valve to establish said minimum preselected amount of fuel pressure and flow during idle and no-load operating conditions.

4,186,708

FUEL INJECTION APPARATUS WITH WETTING ACTION

Lauren L. Bowler, Bloomfield Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

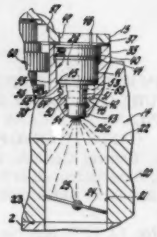
Division of Ser. No. 922,339, Jul. 6, 1978, and a continuation-in-part of Ser. No. 853,331, Nov. 21, 1977, abandoned. This application Nov. 17, 1978, Ser. No. 961,843
Int. Cl.[2] F02M *39/00*; **F02B** *33/00*
U.S. Cl. 123—139 AW **3 Claims**

1. An improved low fuel pressure throttle body fuel injection system for a gasoline internal combustion engine comprising in combination:

a throttle body defining a cylindrical bore communicating at its outlet end with the intake manifold of the engine and at its inlet end being open to atmospheric air;

a throttle disposed in said bore and composed of a butterfly valve rotatable about an axis normal to the axis of the bore and effective as the valve is progressively closed to define curved diametrically opposed crescent moon shaped air flow spaces having progressively less cross section whereby as the throttle is closed air flow between the same and the bore increases in velocity up to sonic velocity when the throttle approaches the closed condition;

a fuel injector disposed upstream of the throttle and coaxial with the bore, the fuel injector receiving fuel at low pressure and injection at such pressure in pulses having a spray pattern with a radial velocity component so as to be directed towards the wall of the bore upstream of the throttle and having fuel flow orifices such as to provide droplet



formation incapable of traveling to the walls under open throttle conditions but capable of reaching the walls under closed and nearly closed throttle conditions, whereby with the throttle closed or nearly closed the fuel travels to the bore, collects on the same, and gravitates towards the space between the throttle and the bore, where it is subjected to sonic air flow rates and vaporized, and

means to actuate the fuel injector in pulses in timed relation to engine speed such that with the throttle in idle position the fuel penetrates the air stream and collects in the throttle bore to gravitate down the same and under off-idle conditions the fuel is entrained by the air stream before reaching the throttle bore.

4,186,709

IGNITION DISTRIBUTOR HOUSING ANTI-ROTATIONAL LOCKING ARRANGEMENT

Charles P. Bolles, Grosse Pointe Farms, Mich., assignor to General Motors Corporation, Detroit, Mich.

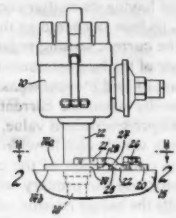
Filed Jul. 31, 1978, Ser. No. 929,652
Int. Cl.[2] F02P *7/02*
U.S. Cl. 123—146.5 A **1 Claim**

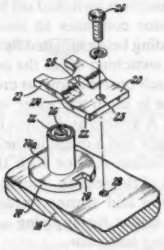
1. An ignition distributor housing anti-rotational locking arrangement comprising:

a unitary distributor housing and mounting flange arrangement rotatably mountable upon an internal combustion engine, said mounting flange having top and bottom surfaces extending outwardly from said distributor housing and an inwardly extending notch; and

a hold-down clamp adapted to be mounted on said engine by a mounting bolt, said engine including a threaded bore for accommodating said bolt, and having a first portion for engaging said top surface of said mouting flange, a second apertured portion outboard of said mounting flange and offset from said first portion by a distance substantially equal to the thickness of said mounting flange to a plane substantially parallel to that of said first portion for engaging said engine and an intermediate portion extending between said first and second portions outboard of said mounting flange having a tang portion extending inwardly toward said mounting flange and so located that when said mounting bolt is extended through said aperture of said second portion and threaded into an accommodating threaded bore of said engine and is tightened to securely clamp said distributor housing in place at an initial angular

setting, said tang portion of said intermediate portion is accommodated by said inwardly extending notch of said





mounting flange in close tolerance fit whereby said distributor housing is securely maintained in the initial angular setting.

4,186,710

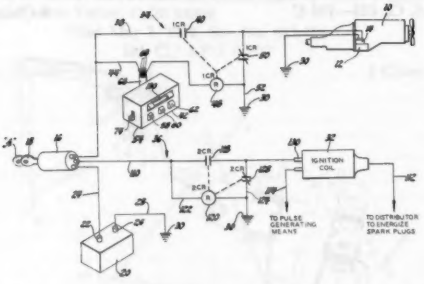
VEHICLE DIGITAL ANTI-THEFT SYSTEM

Woodson B. Kilgore, 31827 Maine, Livonia, Mich. 48150

Filed Aug. 7, 1978, Ser. No. 931,377

Int. Cl.[2] B60R *25/00*

U.S. Cl. 123—146.5 B **6 Claims**



1. In combination with a motor vehicle having an engine, a source of electrical energy, and electrical starter means operable to turn said engine,

a plurality of digital members, each digital member being movable to a plurality of positions, including a first selected position and a second selected position, said digital members being disposed in a first coded arrangement when each digital member is disposed in its respective first selected position, and being disposed in a second coded arrangement when each digital member is disposed in its respective second selected position;

an ignition key;

electrical circuit means including an ignition key switch for connecting said source of electrical energy to said starter means to energize same at such times as the ignition key is in a predetermined position in said ignition switch;

a control switch movable between a first position and a second position, said control switch being connected in said circuit means such that the starter means is connected to the source of electrical energy to turn said engine in response to manipulation of the key in said ignition key switch either when the control switch is disposed in said first position and the digital members are disposed in said first coded arrangement, or the control switch is disposed in said second position and the digital members are disposed in said second coded arrangement, but manipulation of the key in said ignition switch is inoperable to energize the starter means when the digital members are not in a coded arrangement corresponding to the position of the control switch.

4,186,711

IGNITION DEVICE WITH SPEED LIMITATION FOR INTERNAL COMBUSTION ENGINES

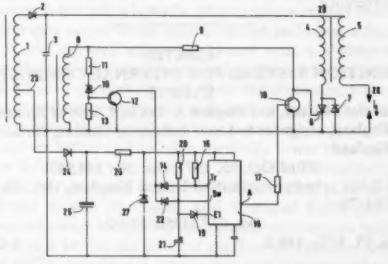
Manfred Jöerg, Fuerth, Fed. Rep. of Germany, assignor to Helga Mueller, Fed. Rep. of Germany

Filed Jun. 13, 1977, Ser. No. 806,216

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1976, 2630261

Int. Cl.[2] F02P *1/00*

U.S. Cl. 123—148 CC **9 Claims**



1. An ignition arrangement with speed limitation for internal combustion engines comprising: a voltage source; switching means actuatable by a trigger pulse for generating a high ignition voltage and including capacitor ignition means with thyristor control; timing means triggered by a trigger pulse for preventing renewed actuation of said switching means by a trigger pulse within a predetermined reference time interval of said timing means, a magnet moving past an ignition armature for inducing said high ignition voltage; said switching means generating a substantially precisely predetermined and temperature-compensated pulse with each trigger pulse, said temperature-compensated pulse being independent of the potential of said voltage source and having said predetermined reference time interval at limiting rotational speed when below the limiting rotational speed; discharge switch means being actuatable by said trigger pulse; said timing means having a time-determining capacitor connected in parallel with said discharge switch means, said capacitor resetting said timing means upon attaining a predetermined charge voltage.

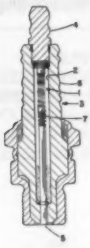
4,186,712
RFI-SUPPRESSING IGNITION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Arthur O. Fitzner, and James R. Hager, both of Fond du Lac, WI, assignors to Brunswick Corporation, Fond du Lac, Wis.

Continuation of Ser. No. 698,066, Jun. 21, 1976, which is a continuation of Ser. No. 516,990, Oct. 22, 1974, which is a division of Ser. No. 323,089, Jan. 12, 1973, Pat. No. 3,871,349. This application Jun. 12, 1978, Ser. No. 914,727

Int. Cl.[2] F02P *1/00*

U.S. Cl. 123—148 CB **6 Claims**



1. An ignition system for an internal combustion engine capable of operating with substantially reduced radiation of radio frequency interference, comprising in combination; a breakerless and mechanically distributorless capacitor discharge ignition system, and an inductor spark plug, said spark plug having a center electrode and an inductor element in electrical series therewith, said center electrode and inductor element being enclosed within an insulator body of the spark plug, and said inductor element having a resistance of between 10 and 100 ohms and an inductance of between 10 and 100 microhenries, whereby the inductance of said element will necessarily coact with the inherent capacitance of the ignition system to substantially reduce radiation of radio frequency interference.

4,186,713
IGNITION SYSTEMS FOR INTERNAL COMBUSTION ENGINE

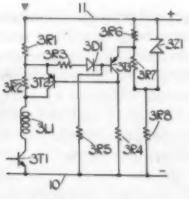
Lancelot Phoenix, and Stephen A. Eckhoff, both of Birmingham, England, assignors to Lucas Industries Limited, Birmingham, England

Filed Oct. 25, 1977, Ser. No. 844,947

Claims priority, application United Kingdom, Oct. 28, 1976, 44793/76

Int. Cl.[2] H05B *37/02*

U.S. Cl. 123—148 E **8 Claims**



1. An ignition system for an internal combustion engine comprising an output transistor having its emitter connected to one of a pair of supply conductors, an ignition transformer having a primary winding which has one end connected to the collector of said switching transistor, a ballast resistor and a current sensing resistor connected in series between the other end of the primary winding and the other of said supply conductors, a ballast by-pass transistor, of opposite conductivity type from the output transistor, having its emitter connected to the junction of the ballast resistor and the current sensing resistor, and its collector connected to said other end of the primary winding, a sensing transistor of the same conductivity type as said by-pass transistor and having its emitter connected to said other supply conductor, its base connectd to the junction of the ballast resistor and the current sensing resistor and its collector connected to the base of the by-pass transistor and a bias resistor connecting the base of said by-pass transistor to said one supply conductor, whereby when the current in the current sensing resistor is below a predetermined value, which is below the steady state current which can flow from the power supply through the series combination of the current sensing resistor, the ballast resistor and the primary winding, the by-pass transistor short-circuits the ballast resistor, whereas when the current reaches the predetermined value the by-pass transistor is switched off but the current in the current sensing resistor continues to increase, current flow in the primary winding being initiated by switching on of the output transistor and switching off of the output transistor causing interruption of such current flow to create a high voltage spark producing pulse in the transformer secondary winding.

4. A system as claimed in claim 1, further comprising a first resistor and a diode in the connection between the junction of the ballast resistor with the current sensing resistor and the base of the sensing transistor, a second resistor connecting the base of said sensing transistor to said one supply conductor, and means for applying a bias voltage to the emitter of the sensing transistor.

4,186,714
SOUND INSULATED INTERNAL COMBUSTION ENGINE

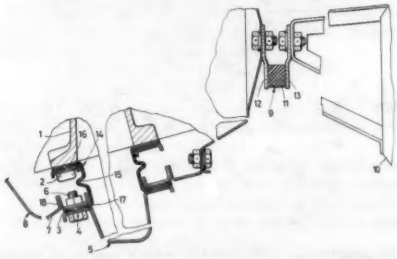
Hermann Danckert; Michael Willmann, and Egon Wundrak, all of Wolfsburg, Fed. Rep. of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Fed. Rep. of Germany

Filed Oct. 18, 1978, Ser. No. 952,446

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1978, 2825927

Int. Cl.[2] F02F *7/00;* **B60K** *9/00*

U.S. Cl. 123—195 C **5 Claims**



1. In an internal combustion engine having an engine block, an oil pan and a sound insulating capsule shrouding the engine block; the engine block and the oil pan having circumferential mounting faces oriented towards one another; mounting means including a sound dampening intermediate layer situated between said mounting faces for a noise-dampened connection of said oil pan with said engine block and with a lower terminal zone of the capsule; the improvement comprising means for attaching said oil pan to said lower terminal zone of said capsule; further wherein said capsule is supported by a component other than the internal combustion engine and wherein said intermediate layer is constituted by a gasket having at least one fold to take up relative motions between said engine block and said oil pan during operation of the internal combution engine.

4,186,715

SPLIT ENGINE OPERATION OF CLOSED LOOP CONTROLLED MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

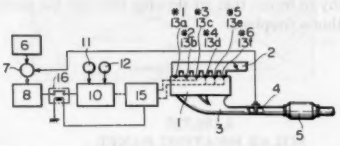
Haruhiko Iizuka, Yokosuka, and Nagayuki Marumo, Yokohama, both of Japan, assignors to Nissan Motor Company Limited, Yokohama, Japan

Filed Sep. 28, 1978, Ser. No. 947,164

Claims priority, application Japan, Nov. 22, 1977, 52-157028[U]

Int. Cl.² F02D *17/00*

U.S. Cl. 123—198 F **2 Claims**



1. An engine control system for a multi-cylinder internal combustion engine having a plurality of cylinders consisting of a first group of cylinders and a second group of cylinders, said system comprising:

an oxygen sensor provided in an exhaust system of the engine;

means for supplying fuel to the engine;

means responsive to load on the engine for preventing fuel to be supplied to the first group of cylinders to effect split operation of the engine;

means responsive to an output from said oxygen sensor for controlling said fuel supplying means to effect feed back control; and

means whereby the feed back control is suspended during the split operation of the engine and for a predetermined time duration after the termination of the split operation of the engine.

4,186,716

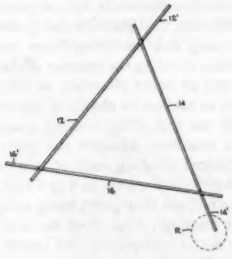
PORTABLE CAMPFIRE GRILL

David E. Baker, and Kenneth D. Baker, both of 18880 Walnut Dr., Castro Valley, Calif. 94546

Filed May 5, 1976, Ser. No. 683,406

Int. Cl.² A47J *37/07*

U.S. Cl. 126—29 **1 Claim**



1. A portable campfire grill for supporting cooking pots on an open fire comprising a trinity of substantially identical straight linear elongate members constructed of substantially rigid heat resistant resilient material having an elastic limit, each said elongate member having a substantially uniform cross sectional shape throughout its length and a thickness dimension, two spaced apart portions of each said elongate member defining first and second oppositely opening slots extending substantially perpendicularly of the longitudinal axis of said member, each said slot having a dimension longitudinally of the respective elongate member greater than the thickness dimension and less than $\sqrt{3}$ times the thickness dimension so as to stress within the elastic limit the elongate members when assembled into a triangular configuration by interengaging the slots of respective said members, said slots having a depth approximately equal to $\frac{1}{2}$ said width dimension so that when said members are interengaged with one another the exterior surfaces thereof are substantially coplanar, said first slot in each said member being spaced farther from the adjacent end than said second slot so that each said member has a relatively long leg portion outward of said first slot, so that with said first slot in an upward position said grill can be supported at three triangularly spaced locations which are outwardly remote from the apices of said triangular configuration.

4,186,717

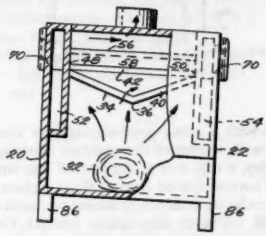
STOVE STRUCTURE

John M. King, Yorktown, Va., assignor to KBS Enterprises, Newport News, Va.

Filed Jan. 16, 1978, Ser. No. 869,764

Int. Cl.² F24B *3/00*

U.S. Cl. 126—66 **6 Claims**

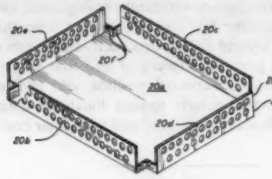


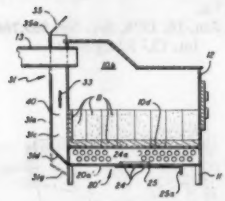
1. A stove comprising an enclosure having a front wall, a rear, a bottom, a top and side walls, closure means on said front wall for allowing access to the interior of said enclosure, a flue opening in said top wall adjacent said rear wall, a V-shaped baffle plate having a front edge secured to the interior of said front wall so as to prevent passage of air therebetween, a rear edge spaced a distance from said rear wall of said enclosure, side edges secured in an airtight manner to each respective side wall of said enclosure and an edge vertically lower than said side edges defining the base of the "V" located at substantially the midpoint between said side walls and extending generally perpendicular to said front wall, said V-shaped baffle plate being disposed closer to said top wall than to said bottom wall of said enclosure so that the heat and gas flow that reaches said V-shaped baffle plate from a combustion source supported on said bottom wall will be directed toward each said side wall, baffle wall means located at least partly above said V-shaped baffle plate for defining a vent path extending from between said V-shaped baffle plate and said rear wall, between said V-shaped baffle plate and said baffle wall means toward said front wall and, then, from said front wall between said top wall and said baffle wall means toward said flue opening,

said stove further comprising air channel means on each side wall extending from said rear wall toward said front wall, said air channel means being open to room air at said rear wall and having vent means adjacent said front wall, each air channel means having a vertical dimension that decreases progressively from said rear wall to said front wall, and

said rear wall of said stove having a chamber mounted thereon, the interior of which is open to each said air channel means, said chamber having an opening to room air located vertically below the point where said air channel means are open to room air.

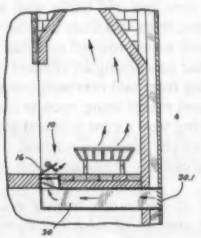
4,186,718
STOVES
Paul O. Goodwin, Box 52, R.D. 2, Mehoopany, Pa. 18629
Filed Jan. 3, 1978, Ser. No. 866,654
Int. Cl.[2] F24B *3/00*; F24C *15/08*
U.S. Cl. 126—67 **11 Claims**





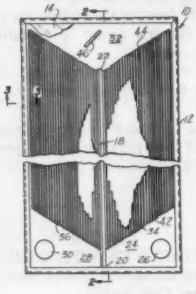
1. For use with a stove generally of box shape having a bottom lined with a layer of fire resistant material, a plurality of vertical sides, a top, and a plurality of legs supporting the stove with its bottom spaced above a floor surface, heat shielding and air circulating attachment means comprising first panel means adapted for ready attachment beneath the bottom of said stove and having a substantially horizontal plate portion and a plurality of substantially vertical side portions extending upwardly from said plate portion, said plate portion and side portions having means adapted to accommodate the legs of the stove whereby said first panel means is readily attachable beneath the bottom of the stove with the upper edges of said vertical side portions adjacent the bottom so as to form a substantially horizontal air passageway between the bottom and said horizontal plate portion, said vertical side portions including a plurality of apertures through which air enters said passageway to cool the bottom of the stove and shield the floor surface underneath.

4,186,719
AIR SUPPLY DEVICE FOR FIREPLACES
Bernard L. Dalsin, Edina, Minn., assignor to Bernard Dalsin Manufacturing Company, Bloomington, Minn.
Filed Sep. 19, 1977, Ser. No. 834,164
Int. Cl.[2] F24B *13/02*
U.S. Cl. 126—143 **9 Claims**



1. An air supply device for a fireplace comprising a housing installable forwardly of the fireplace and having an air inlet and outlet, adjustable volume damper means carried by the housing for controlling the volume of air passing through the housing, an independently adjustable direction damper means carried by the housing for receiving air controlled by the volume damper means and for controlling the direction of air flow from the device toward the fireplace, the volume damper means being closely adjacent the direction damper means and adjustable to deflect air toward the direction damper means, and means for maintaining the position of the direction damper means, the position-maintaining means including limit means positively limiting the adjustability of the direction damper means thereby to insure that air flowing through the device is directed within a fireplace.

4,186,720
SOLAR HEATING PANEL
Robert W. Schmauder, Sr., and Robert W. Schmauder, Jr., both of Fleetwood, Pa., assignors to Solar Shelter Engineering Inc., Kutztown, Pa.
Filed Feb. 27, 1978, Ser. No. 881,448
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—445 **5 Claims**

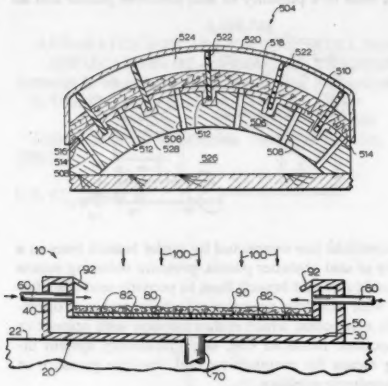


1. A solar heating panel comprising an elongated rectangular housing having one major face transparent to solar energy and a base sheet on the opposite major face, a partition between said faces in said housing, said partition being shorter than the length of said housing and extending from one end of the housing, said partition dividing the enterior of the housing into an inlet chamber and an outlet chamber, an inlet to said inlet chamber and outlet to said outlet chamber, the inlet and outlet being adjacent said one end of the housing, a connecting passage between said chambers adjacent the other end of said housing, heat collectors dividing each of said chambers into discrete parallel paths which are about 4 to 8 times higher than the width of the paths, said flow paths being open at each end thereof whereby a fluid may flow from the inlet through the flow paths of the outlet chamber to the outlet, each of the collectors being L-shaped in cross section with its short leg being secured to the base sheet and abuting the lower end of the long leg of the next adjacent collector, each long leg of each collector extending from the base sheet to said first major face, the collectors in the inlet chamber and in the outlet chamber being of the same length, the ends of the collectors being arranged on a bias to evenly distribute air flow from the inlet to said flow paths in the inlet chamber, the ends of said collectors being arranged at a bias from one end of said partition to a corner of said housing to thereby define an edge of said connecting passage, said connecting passage being free from said collectors.

4,186,721
SOLAR ENERGY HEAT COLLECTOR

William C. Whitman, 3 Fourth St., New Brunswick, N.J. 08901

Filed Jul. 5, 1977, Ser. No. 812,812
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—430 5 Claims

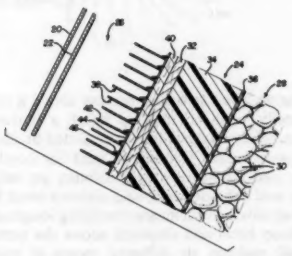


1. A solar energy heat collector comprising
a curved rigid insulating form having a top surface and a bottom surface and having a plurality of through holes,
a plurality of slots extending along the top surface of said form,
a first layer of heat-absorptive material on the top surface of said form and having holes aligned with said through holes,
a second layer of fibrous, heat-absorptive material on said first layer,
a sheet of material, which transmits solar energy, spaced from said second layer to provide an air space, and
means disposed in said slots and supporting said sheet spaced from said fibrous layer.

4,186,722
SOLAR ENERGY COLLECTOR

Charles E. Muessig, Imlay City, Mich., assignor to International Solar Technologies, Inc., Bainbridge, Ind.

Filed Apr. 27, 1977, Ser. No. 791,274
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—428 4 Claims

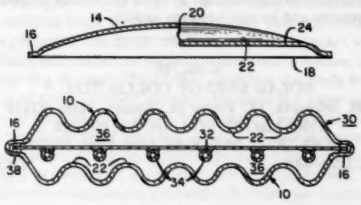


1. In a solar energy collecting and storing unit utilizing a heat collecting chamber defined by a front transparent sheet through which solar energy may enter, a thermally insulated back wall substantially parallel to the front sheet, and thermally insulated side walls completing the enclosure of the chamber, an inlet port through which air to be heated may be admitted to the chamber, an outlet port through which heated air may leave the chamber, and a system of baffles substantially bridging the space between the front sheet and the back wall and defining a predetermined path for air traversing the chamber between the inlet and outlet ports, the improved solar energy absorbing means which comprises:
a plurality of elongated sheet metal fins, each fin having a generally L-shaped cross section defined by a first leg lying in a plane substantially parallel to the back wall and a second leg extending substantially perpendicularly away from its intersection with said first leg and toward the front sheet but with the free end of said second leg terminating at a point spaced from the front sheet to define an air flow channel between said free ends and the front sheet, both legs of said fins being darkened to provide maximum absorption of solar energy;
said fins and the baffles being mounted within said chamber so that said free ends of said fins extend perpendicularly to the direction of air flow along the predetermined path and through said channel.

4,186,723
CONTOURED INSULATION WINDOW FOR EVACUATED SOLAR COLLECTOR

Frank T. Coppola, Horseheads; William P. Lentz, Addison, and Robert V. VanDewoestine, Corning, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Apr. 10, 1978, Ser. No. 894,899
Int. Cl.[2] F24J 3/02; E04B 7/18
U.S. Cl. 126—443 5 Claims

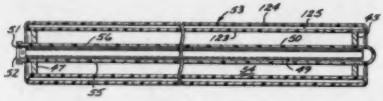


1. An evacuated flat plate solar collector comprising, means forming a housing for said evacuated flat plate solar collector, said housing means including an upper portion and a lower portion defining a partially evacuated chamber therebetween, solar energy collector plate means positioned within said chamber between said upper and lower housing portions, fluid channel means associated with said collector plate means for removing heat therefrom, said upper housing portion including a solar glass window contoured to provide sufficient strength to withstand the force of atmospheric pressure exerted on one side thereof, said contoured solar window having both a longitudinal and a lateral expanse bounded by peripheral support means lying within a first plane, said peripheral support means being sealably connected to the lower portion of said housing and providing the sole support for said contoured glass window, a plurality of laterally extending support beams spaced-apart longitudinally along said contoured glass window, said beams projecting arcuately outwardly from said planar support means at opposite ends thereof, each said support beam having a maximum bending stress not exceeding that obtained as a constant stress beam, said plurality of beams being joined along adjacent portions thereof to form a plurality of sinusoidal corrugations extending longitudinally along said solar window, the junctures of said adjacent beams lying in a second plane parallel to said first plane and vertically spaced apart therefrom, and said plurality of laterally extending beams, except where communicating with and projecting outwardly from said peripheral support means, being spaced apart from and out of contact with the remainder of said evacuated flat plate solar collector so as to inhibit conductive heat losses from the collector plate means to the solar window.

4,186,724
SOLAR ENERGY COLLECTOR

David H. Nelson, Arroyo Grande, Calif., assignor to American Solar, Arroyo Grande, Calif.

Continuation-in-part of Ser. No. 744,290, Nov. 22, 1976, Pat. No. 4,108,154. This application Jan. 27, 1978, Ser. No. 872,890
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—443 20 Claims



12. A linearly extending solar energy collection apparatus carrying a solar energy collection and heat transfer fluid comprising:

a pair of metal fluid transfer tube segments linearly extending in spaced parallel relationship to receive solar radiation and joined at one end in a serial fluid transfer connection, whereby said fluid flows within said tube segments in opposite directions,

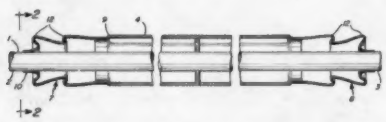
a glass vacuum jacket of elongated toroidal configuration having a cylindrical interior wall laterally encompassing said pair of metal fluid transfer tube segments and transverse end closure means extending across the area enclosed by said interior wall at both ends thereof to define an elongated volume of dead air and

end support means coupled at both ends both to said tube segments and to said vacuum jacket.

4,186,725
SOLAR ENERGY COLLECTOR

David M. Schwartz, 137 Foster St., Boston, Mass. 02135

Filed Mar. 29, 1978, Ser. No. 891,210
Int. Cl.[2] F24J 3/02; F28F 7/00; F16L 55/00
U.S. Cl. 126—443 2 Claims



1. In a solar energy collector having an elongated metal tube through which solar heated fluid may pass, said metal tube coated with a heat absorption layer and a transparent glass tube enclosing said metal tube, the improvement comprising,

a pair of metal annular bellows each having its outer periphery sealed in a glass to metal seal to said glass tube and its inner periphery sealed to said metal tube, said bellows and said glass and metal tubes defining a vacuum chamber having an internal pressure in the order of 10^{-6} torr, said inner and outer peripheries of said bellows are longitudinally displaced from one another to accommodate differential radial and linear expansion of said metal and glass tubes.

4,186,726
APPARATUS AND METHOD FOR COLLECTING SOLAR ENERGY

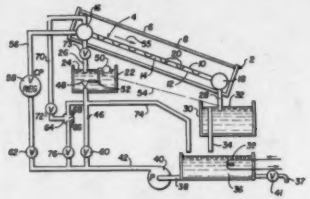
Donald L. Spencer, Iowa City, Iowa, assignor to The University of Iowa Research Foundation, Iowa City, Iowa

Division of Ser. No. 670,764, Mar. 26, 1976, abandoned. This application Dec. 30, 1977, Ser. No. 866,202
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—444 9 Claims

1. A solar collector system comprising

a plurality of absorber panels for receiving radiant solar energy, each of said absorber panels having an internal flow passage,

a circulatory system including means entirely filling said passages with heat-receiving liquid and circulating said liquid through said absorber panels, said circulatory system including an inlet manifold line connected by inlet branch lines to a plurality of said absorber panels and an

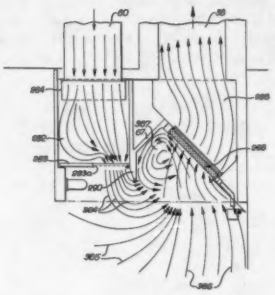


outlet manifold line connected by outlet branch lines to a plurality of said absorber panels, pressure reducing means in a plurality of said branch lines to provide said absorber panels with absolute pressure which increases progressively in a direction which is downstream with respect to the associated manifold line, said circulatory system including means for maintaining said absolute pressure at subatmospheric pressure.

4,186,727
AIR VENTILATION AND WASHING SYSTEM

Arnold S. Kaufman, Studio City, and Robert L. Anderson, Reseda, both of Calif., assignors to National Food Service Equipment Fabricators, Inc., Glendale, Calif.

Continuation-in-part of Ser. No. 652,484, Jan. 26, 1976, Pat. No. 4,085,735. This application Jun. 20, 1977, Ser. No. 807,917
Int. Cl.[2] F21C 15/08; F23J 11/00
U.S. Cl. 126—299 D 20 Claims



1. In a ventilating hood structure for use above a cooking area: a horizontally extended makeup hood; a horizontally extended exhaust hood; a longitudinally extended divider wall between said hoods; means forming an inlet for conducting makeup air into said air hood; means forming an outlet for exhaust air from said exhaust hood; said makeup hood having a lower makeup air distribution means extending longitudinally within said makeup hood and disposed above the bottom of said divider wall; makeup air diffusing means at said inlet disposed in said makeup hood above and spaced from said air distribution means; said makeup hood having walls defining a makeup plenum with said divider wall, air distribution means and air diffusing means; said air distribution means being constructed to restrict the flow of makeup air from said makeup air plenum to maintain a positive pressure in said makeup air plenum causing equal distribution of makeup air throughout the length of side makeup air plenum; said exhaust hood having

filter means extending longitudinally and facing said divider wall and having walls defining with said filter means an exhaust plenum communicating with said outlet; air flowing through said air distribution means discharging downwardly along said divider wall to a region below its lower end and then turning toward said exhaust hood.

4,186,728

APPARATUS FOR ADAPTING A SKULL FOR THE APPLICATION OF A PRESSURE TRANSDUCER

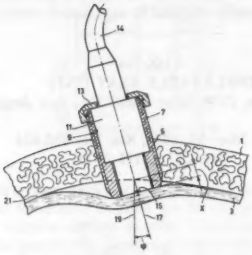
Antonius L. M. van Lotringen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 12, 1977, Ser. No. 859,744

Claims priority, application Netherlands, Feb. 18, 1977, 7701722

Int. Cl.[2] A61B *19/00*

U.S. Cl. 128—1 R **5 Claims**



1. Apparatus for adapting a human or animal skull for the application of a pressure transducer for the epidural measurement of the intracranial pressure, comprising: a screw with a continuous axial cavity in which the pressure transducer can be accommodated; a tool which is shaped to engage with the screw for introducing said screw into a hole in the skull; and indicator means which function to indicate when the screw has been introduced into the hole to the desired depth, which indicator means include a sensor which, in the operating condition, extends through the cavity in the screw.

4,186,729

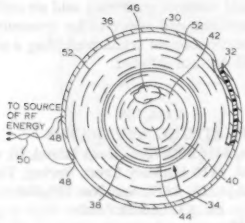
DEEP HEATING ELECTRODE

William H. Harrison, Woodland Hills, Calif., assignor to Donald L. Morton & Associates, Los Angeles, Calif.

Filed Nov. 25, 1977, Ser. No. 854,730

Int. Cl.[2] A61N *1/42*

U.S. Cl. 128—1.3 **17 Claims**



1. The method of deep heating animal tissue comprising the steps of:

(a) placing the animal tissue in non-contacting relationship within a substantially annular region defined by a single turn loop electrode; and,

(b) exciting said electrode with radio frequency energy to establish a magnetic field comprising a plurality of concentric electrostatic field lines of similar magnitude within said annular region whereby the tissue is heated throughout.

4,186,730

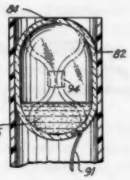
METHODS FOR COLLECTING BODY FLUIDS

Louis Bucalo, 155 Roberts St., Holbrook, N.Y. 11741

Continuation-in-part of Ser. No. 534,893, Dec. 20, 1974, Pat. No. 3,998,211, which is a continuation-in-part of Ser. No. 499,925, Aug. 23, 1974, Pat. No. 3,934,575, and a continuation-in-part of Ser. No. 499,926, Aug. 23, 1974, Pat. No. 3,924,607, each Division of Ser. No. 329,862. This application Dec. 2, 1976, Ser. No. 746,827

Int. Cl.[2] A61B *10/00*

U.S. Cl. 128—769 **14 Claims**



1. In a method for collecting fluids from the body of a human being or animal, the steps of positionally arranging an enclosure in juxtaposition to a cavity of the body which at least at times contains body fluid in such manner that when the body fluid is present in the cavity the enclosure is in contact with the body fluid, said enclosure having within itself a hollow interior for receiving the body fluid while shielding the body from the interior of the enclosure, creating between the interior of the enclosure and the body fluid conditions for only inward transfer of the body fluid into the interior of said enclosure, the inward transfer of the body fluid into the enclosure commencing solely as a result of the contact with the body fluid, so that the collection commences automatically without external actuation, and maintaining said inward transfer conditions effective at least part of the time while the enclosure remains in contact with the body fluid, so that thereafter when the enclosure is separated from the body cavity, the desired body fluid will be situated in the interior of the enclosure.

4,186,731

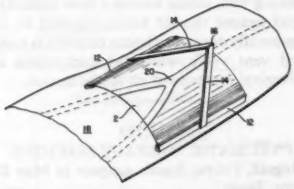
TOPICAL THERMOGRAPH

William T. Clark, III, Number Six Davis Blvd., New Orleans, La. 70121

Filed May 15, 1978, Ser. No. 905,849

Int. Cl.[2] A61B *5/00*

U.S. Cl. 128—736 **8 Claims**



1. Topical thermographic apparatus comprising a flexible sheet of thermographic material having a myriad of closely-adjacent sites which respond chromatically according to variations in temperature and being adapted to be engaged against a body surface (for displaying variations in color characteristic of various temperatures along the body surface,) and sheet-edge engaging means for applying opposing forces across the

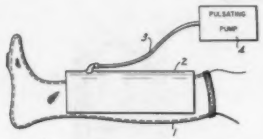
sheet in response to force against the surface of the sheet, whereby to maintain substantially uniform pressure of the sheet surface against those portions of a body surface against which the surface of the sheet is pressed.

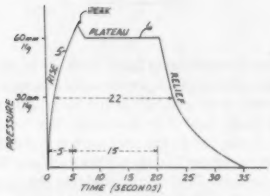
4,186,732

METHOD AND APPARATUS FOR PULSING A BLOOD FLOW STIMULATOR

William D. Christoffel, Two Rivers, Wis., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Dec. 5, 1977, Ser. No. 857,312
Int. Cl.[2] A61H *1/00*
U.S. Cl. 128—24 R **20 Claims**





1. A method of controlling the inflation rate and pressure in a body compression device for aiding blood circulation comprising the steps of:

(a) utilizing a gas pressure at an output of a gas supply source that is greater than the desired operating pressure for the device;

(b) venting a portion of the gas from the output to establish a control pressure less than said gas supply pressure;

(c) dispensing gas at the control pressure into the device for a measured period of time which automatically provides a predetermined inflation rate and operating pressure; and

(d) maintaining a generally constant plateau pressure for a measured period of time by opening a balancing vent means downstream.

18. Apparatus for supplying intermittent pressure to a body compression device for aiding in blood circulation comprising: an air compressor capable of generating air pressure substantially greater than the desired peak pressure for such device; said apparatus including timing means coupled to a downstream balancing vent means having a flow capacity and pressure balanced against the air being supplied to the device, whereby a generally constant plateau pressure is maintained by the balanced vent valve while the compressor is simultaneously delivering compressed air to the device.

4,186,733

PNEUMATIC MASSAGE MACHINE

Tadahisa Mogaki, Tokyo, Japan, assignor to Man Design Co., Ltd., Tokyo, Japan

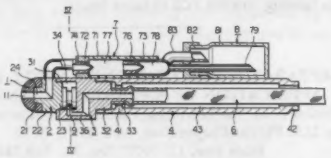
Filed Jun. 7, 1978, Ser. No. 913,318
Claims priority, application Japan, Aug. 19, 1977, 52-109990
Int. Cl.[2] A61H *1/00, 9/00*
U.S. Cl. 128—32 **17 Claims**

1. A pneumatic massage machine comprising

a semi-spherical vibratory massage head having a construction allowable of dispersion of liquid therethrough,

means for pneumatically driving said massage head for vibration and connected to a given supply source of compressed air,

a main cylindrical body carrying said massage head via said pneumatic driving means,



a liquid reservoir disposed to said main cylindrical body and connected to said massage head for supply of said liquid,

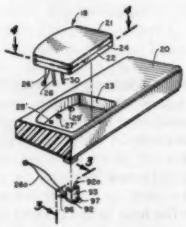
means for forcibly discharging said liquid out of said liquid reservoir upon application of user's finger action thereto and operationally coupled to said liquid reservoir.

4,186,734

INFLATABLE SEAT UNIT

John M. Stratton, 2936 Briar Knoll Dr., Los Angeles, Calif. 90046

Filed Mar. 22, 1978, Ser. No. 888,834
Int. Cl.[2] A61H *1/00*
U.S. Cl. 128—33 **9 Claims**



1. In an inflatable seat unit having a plurality of adjacent, individual elongated air cells located on a seat and selectively inflated by a control mechanism to produce a translational pressure wave along the seat;

said unit comprising a piece of foam material containing a cavity;

said air cells being completely located in said cavity;

a portion of said material fully overlying all said air cells and located at a surface of said seat;

said portion of said material overlying said air cells having a thickness permitting said wave to be transmitted therethrough to a seat occupant while providing a soft surface when said cells are not inflated.

4,186,735

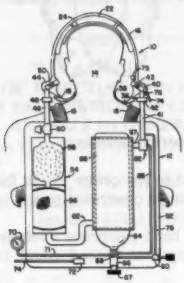
BREATHING APPARATUS

John W. Henneman, 4416 39th Ave., Rock Island, Ill. 61201, and Michael G. Flood, 6119 Hickory Crest, Spring, Tex. 77373

Filed Apr. 21, 1977, Ser. No. 789,646
Int. Cl.[2] A62B *7/00*
U.S. Cl. 128—201.25 **12 Claims**

11. A portable breathing apparatus for use by a wearer and comprising: a helmet having a bottom opening adapted to slip over the head of the wearer as it is put on, an annular, flexible neck seal means mounted in the bottom opening and having a neck opening adapted to expand to slip over the head of the wearer as the helmet is mounted and to contract to seat against the neck of the wearer when the helmet is worn, the neck seal sealing the helmet bottom opening to form a substantially

airtight enclosure about the head of the wearer, and a door having a transparent portion opposite the eyes of the wearer and swingably mounted on the helmet for swinging between an open condition, wherein it permits exposure of the helmet interior to ambient atmosphere and provides manual access for adjustment of the neck seal, and a closed condition wherein it seals the helmet interior from the ambient atmosphere; a breathing line means connecting the air supply to the interior of the helmet; an exhaust means operatively connected to the helmet for permitting the exhaust of gas from the helmet interior; a portable pack adapted to be carried by the wearer and



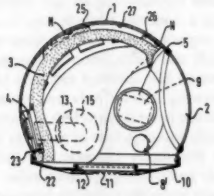
including an oxygen tank, an air scrubber means connected to and adapted to receive exhaust gas from the helmet exhaust means and remove carbon dioxide therefrom, and regulator valve means operatively connected to the air scrubber means, the oxygen tank and the breathing line for mixing oxygen from the oxygen tank with gas from the air scrubbing means and delivering the mixed gas to the breathing line; and heat exchanger conduit means connecting the air scrubber means to the regulator valve means and closely surrounding a substantial portion of the oxygen tank exterior in a heat exchanging relationship therewith to transfer heat from the gas in said conduit to the oxygen tank.

4,186,736

DEVICE FOR SAFEGUARDING THE RESPIRATORY ORGANS

Attilio Angioletti, and Giosue Citelli, both of Milan, Italy, assignors to Industrie Pirelli S.p.A., Milan, Italy

Filed Sep. 26, 1977, Ser. No. 836,729
Claims priority, application Italy, Oct. 4, 1976, 27951 A/76
Int. Cl.[2] A62B *18/04*
U.S. Cl. 128—201.19 **4 Claims**



1. A helmet for protecting the head and respiratory organs comprising a rigid outer shell having an open lower portion adapted to fit over the head of a user and provided with a transparent screen across the front portion thereof, a headgear of flexible cellular material placed inside said shell, sealing means connected to the open lower portion of said rigid outer shell and adapted to be secured about the neck of the wearer, containers housing filtering blocks sealingly connected to said rigid outer shell, a ventilating device contained in said helmet, conduits inside said helmet for conveying the filtered air from the filtering blocks to the ventilating device and at least one air passage for conveying the filtered air from the ventilating device to the respiratory organs, whereby air enters the helmet through the filtering blocks, flowing in the conduits recalled by the ventilating device and being sent to the respiratory organs via the air passage, a communications device, a battery operatively connected for supplying electric current to said communication and said ventilating devices and at least one exhaust valve on said helmet for the elimination of air from the helmet, characterized by the fact that:

a slot is present on the external surface of the headgear farthest from the transparent screen and in correspondence of the plane of symmetry of the helmet vertically dividing the transparent screen into two parts, said ventilating device being mounted on the lateral surface of the rigid outer shell and located in said slot of the headgear which is on the side opposite to the transparent screen, with respect to the plane of symmetry substantially parallel to the transparent screen and symmetrically placed with respect to the plane of symmetry of the helmet vertically dividing the transparent screen, are present means for housing and fixing said containers housing filtering blocks,

on a first lateral surface of the rigid outer shell which is on the same side as the transparent screen, with respect to the plane of symmetry substantially parallel to the transparent screen and symmetricallgy placed with respect to the plane of symmetry of the helmet vertically dividing in two the transparent screen are present means for housing said communication device and on a second lateral surface of the rigid outer shell facing said first lateral surface are present means for housing said battery for supplying electric current to said communication device and ventilating device,

sealing means comprising an elastically deformable rubber collar sealingly connected to the lower periphery of said open lower portion of the rigid outer shell and intended to sealingly press around the wearer's neck,

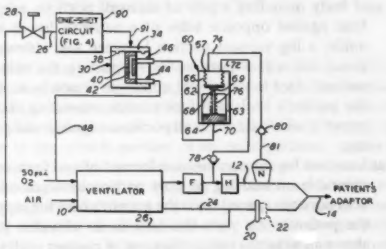
whereby all the space inside the helmet is in communication with the outside atmosphere only through the filtering blocks and the exhaust valve and the center of gravity of the helmet coincides with the oscillating center of the neck of the wearer so that the helmet is perfectly balanced on the head of the wearer with respect to whatever position is assumed by the head of the wearer itself.

4,186,737

DRUG NEBULIZING SYSTEM FOR MEDICAL VENTILATORS OF THE VOLUME-LIMITED TYPE

James D. Valenta, Madison, and Kenneth T. Heruth, Sun Prairie, both of Wis., assignors to Airco, Inc., Montvale, N.J.

Filed Nov. 10, 1977, Ser. No. 850,326
Int. Cl.[2] A61M *16/00*
U.S. Cl. 128—203.28 **7 Claims**



1. A drug nebulizer control system for adding medication to a patient's breathing gas from a medical ventilator of the volume limited type having an inhalation phase where gas having

a predetermined oxygen concentration is delivered to the patient and an exhalation phase, said system comprising:

(a) a patient gas breathing line adapted to receive breathing gas from the ventilator and deliver said gas to the patient during the inhalation phase,

(b) drug nebulizing means connected to said breathing line and adapted to be powered by a pressurized gas to cause injection of nebulized medication into said breathing line,

(c) means to withdraw a predetermined volume of gas of predetermined oxygen concentration supplied from said ventilator during its inhalation phase, and

(d) means to pressurize said withdrawn predetermined volume of gas during the same inhalation phase and apply said pressurized gas to said nebulizing means for powering said nebulizing means to inject the nebulized medication into said breathing line.

4,186,738

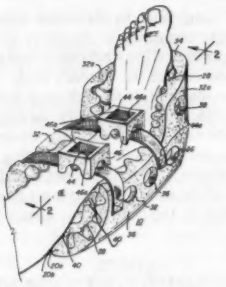
HEEL SUPPORTING BOOT FOR BED PATIENTS

Thomas R. Schleicher, 1819 Oak St., Northbrook, Ill. 60062; Donald J. Maylahn, 4255 Madison St., Skokie, Ill. 60076, and Denis B. Drennan, 4 Milburn Park, Evanston, Ill. 60201

Filed Feb. 15, 1978, Ser. No. 877,876

Int. Cl.[2] A61F *5/30*

U.S. Cl. 128—153 **25 Claims**



1. A heel supporting boot for bed patients comprising:

a body formed of flexible, resilient, sheet foam material having an inside support surface provided with a plurality of alternate peaks and valleys with the peaks adapted for contact against the skin of the patient,

said body including a pair of sidewall portions adapted to bear against opposite sides of a patient's lower leg and ankle, a leg support portion between said sidewall portions, and a foot portion for supporting the sole of the patient's foot in an upright condition remotely away from the patient's heel, said foot portion extending above the upper level of said sidewall portions adjacent said patient's leg;

at lease one leg support cushion formed of said foam material securable on said leg support portion between said sidewall portions spaced from the patient's heel for supporting the patient's leg with the heel in an elevated position above an adjacent bed surface out of contact with said leg support portion of said body, and

detachable fastening means for interconnecting said sidewall portions above said patient's leg to retain said boot in place on the patient's leg.

4,186,739

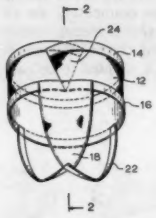
ATHLETIC GARMENT

Gwendolyn L. Hall, and Bradley G. Hall, both of 60 Redcar Ave., Islington, Toronto, Canada (M9B 1K1)

Filed Aug. 19, 1977, Ser. No. 826,149

Int. Cl.[2] A61F *5/40*

U.S. Cl. 128—158 **10 Claims**



1. An athletic supporter including:

a waist band,

a pouch connected to the centre of the front of said waist band and two straps connected to the rear of said waist band,

wherein the waist band comprises a relatively wide elastic portion of a length to extend about the waist of the wearer,

wherein the ends of said waist band are arranged to be connected, at the front of the wearer's body, in overlapping, non-parallel relationship,

wherein the end edges of the waist band diverge in an upward direction and at the lower end connect to each other near the pouch over a circumferential extent, short relative to and approximately centered with respect to the circumferential extent of the top of the pouch.

4,186,740

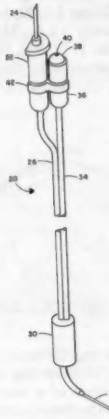
METHOD AND APPARATUS FOR REGULATING INTRAVENOUS FLOW OF A LIQUID

Romeo E. Guerra, 6118 Walnut Hill La., Dallas, Tex. 75230

Filed Feb. 6, 1978, Ser. No. 875,455

Int. Cl.[2] A61M *5/00*

U.S. Cl. 128—214 R **2 Claims**



1. A construction having utility in intravenous flow control, comprising:

(a) a rigid housing having a first liquid-tight compartment with entrance and exit apertures, with the entrance aperture being adapted for connection with a reservoir of liquid which is to be fed intravenously to a patient, and the

exit aperture being adapted for connection with a needle which is to be inserted into one of a patient's veins, and said housing having a second compartment which is immediately adjacent the first compartment, and there being a flexible diaphragm constituting a wall in common between said first and second compartments, and the diaphragm being sufficiently flexible and so positioned so as to selectively restrict the flow of liquid between the entrance and exit apertures of said first compartment; and

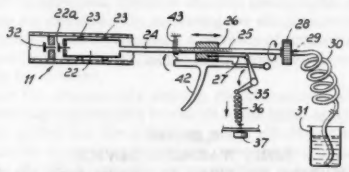
(b) a one-way check valve positioned between the first and second compartments, such that liquid may pass from the first compartment into the second compartment but not vice versa.

4,186,741

AUTOMATIC INJECTING GUN FOR REMOTE CONTROLLED VACCINATION OF CATTLE, PIGS, AND ANIMALS IN GENERAL

Giulio Cesaro, Via Vittorio Veneto, 17, Vigodarzere (Province of Padova), Italy

Filed Dec. 2, 1977, Ser. No. 857,109
Claims priority, application Italy, Dec. 13, 1976, 41700 A/76
Int. Cl.[2] A61M *5/00*
U.S. Cl. 128—218 P **4 Claims**



1. An injecting gun for controlled vaccination of cattle, pigs and animals in general, comprising a supporting box-like gun body having an extension in the form of a handle, an injector assembly supported by said box-like gun body, said injector assembly having a hollow elongated cylinder member with a cylinder cavity having an open ended portion thereof fixed on said box-like body and facing the interior thereof and an opposite end portion thereof projecting outside said box-like body, said opposite end portion having connector means for selectively connecting thereto needle means and auxiliary elongation members, a hollow plunger member with a head portion and a plunger cavity and slidable within said cylinder cavity, a first check valve structure within said cylinder cavity arranged in a position more remote from said open end of the cylinder member than said plunger head portion to define therebetween a cylinder chamber the length whereof being defined by the actual position of said plunger member, a second check valve structure in the head portion of said plunger member, said first check valve structure controlling the flow of vaccination liquid from said chamber towards said opposite end portion of the cylinder cavity and vice versa to prevent such flow when the liquid pressure in said opposite end portion cavity is higher than the liquid pressure in said cylinder chamber and to allow such flow when the pressure conditions are reversed, said second check valve structure controlling the flow of vaccination liquid from said cylinder chamber towards said plunger caivty and vice versa to prevent liquid passage from said cylinder chamber towards said plunger cavity when the liquid pressure within said cylinder chamber is higher than the liquid pressure within said plunger cavity and to allow such passage when the pressure conditions are reversed, duct means for connecting the plunger cavity with a source of vaccination liquid, adjustable limit stop means for said plunger to adjust the maximum volume of said cylinder chamber and trigger means and rechargeable springed release means for said plunger member to actuate the injection action of said plunger member, when said trigger means are triggered.

4,186,742

CONTRACEPTIVE-ANTIVENEREAL DISEASE TAMPON

Jack W. Donald, El Paso, Tex., assignor to Donald Enterprises, Inc., El Paso, Tex.

Filed Jun. 9, 1978, Ser. No. 888,578
Int. Cl.[2] A61F *13/20*
U.S. Cl. 128—270 **14 Claims**

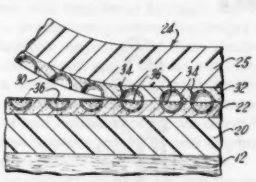
1. A moist medicated vaginal tampon for contraceptive and venereal disease control comprising a soft, porous foam ball of substantially spherical configuration in the uncompressed state and of a size and compressibility to fit snugly within the vagina of a human female to cover the cervix area while permitting intercourse to take place, said spherical configuration permitting easy insertion without the necessity of orientation, said porous foam ball being impregnated with a solution containing an amount of an antibiotic selected from the group consisting of salts of bacitracin, neomycin, polymyxin B and mixtures thereof effective to control venereal disease and a contraceptively effective amount of nonoxynol.

4,186,743

PERFUMING SELF-ADHERING NAPKINS

Fred H. Steiger, East Brunswick, N.J., assignor to Personal Products Company, Milltown, N.J.

Filed Feb. 28, 1978, Ser. No. 882,299
Int. Cl.[2] A61F *13/16, 13/18, 13/20*
U.S. Cl. 128—284 **5 Claims**



1. In a sanitary napkin comprising an elongated absorbent body having a body contacting surface and a garment contacting surface and provided with a pressure-sensitive adhesive element on said garment contacting surface for adhering said napkin to the crotch portion of an undergarment, means for both protecting said pressure-sensitive adhesive element and for releasing a controlled quantity of a deodorant, said means comprising a protective releasable layer overlying and adhered to said adhesive element and having affixed to the surface thereof in contact with said adhesive element, a controlled quantity of deodorant in pressure-frangible microcapsules whereby, upon removing said protective releasable layer, a controlled portion said microcapsules fracture releasing a controlled quantity of deodorant.

4,186,744

SEPARABILITY MEMBER TO ALLOW DISPOSABLE DIAPER OPENINGS AND RE-FASTENINGS

Irving S. Ness, Princeton, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Continuation of Ser. No. 709,748, filed Jul. 29, 1976, abandoned. This application Oct. 31, 1977, Ser. No. 847,458
Int. Cl.[2] A61F 13/16; A43C 11/00
U.S. Cl. 128—287 6 Claims

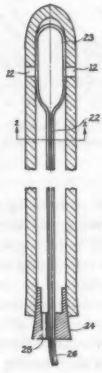
1. In combination with the disposable diaper of the type having a thin, flexible plastic film outer surface and having adhesive closure tabs; a separability member for use with the adhesive portion of a closure tab to allow separation of said closure tab from said diaper and re-fastening thereto without tearing the diaper outer surface, said separability member comprising: a strip of material having a non-adhesive surface for mating with the adhesive portion of said closure tab and an adhesive surface for fastening said strip to the diaper outer surface; and adhesive release areas on the end portions of the non-adhesive surface of said strip, whereby after said diaper has been fastened around a wearer thereof, said adhesive portion of the tab is detachable from said separability member by peeling the two apart without tearing the diaper outer surface due to the reduction or elimination of peel forces transmitted to the diaper surface at the end portions of said strip by the provision of said release areas, the separability member remaining affixed to the diaper after separation for subsequent re-fastening.

4,186,745

POROUS CATHETERS

David W. Lewis, Rte. 2, Box 198, and James J. Kauzlarich, 1603 Inglewood Dr., both of Charlottesville, Va. 22901

Continuation-in-part of Ser. No. 711,067, Jul. 30, 1976, abandoned. This application Feb. 15, 1978, Ser. No. 877,841
Int. Cl.[2] A61M 25/00
U.S. Cl. 128—349 R 5 Claims



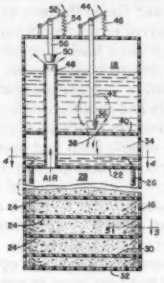
1. A catheter, comprising an annular walled drainage tube with upper and lower ends, having suitable lateral openings at the upper end for receiving body fluids and an outlet at the lower end for discharging such body fluids, said catheter being composed of a flexible material selected from the group of materials consisting of open microporous polyethylene, open microporous polypropylene, open microporous fluorocarbon, open microporous Poly-Oil polyethylene, or other open microporous thermoplastics, of a microporosity in the range of 0.5 to 5 microns, initially containing a liquid medicament and/or lubricant in the interstices of said microporous pores, the size being in the critical range of 0.5 to 5 microns as necessary for the function of flow control of said liquid medicament and/or lubricant so as to retain the liquid medicament and/or lubricant while the catheter is being stored over a long period of time until inserted into a body cavity at which time the liquid will egress or ooze from the catheter due to pressure gradients, and/or gravity gradients, with significant pressure gradients arising from the differential thermal expansion between the microporous catheter material and the liquid medicament and/or lubricant, said differential thermal expansion arising from the change of temperature experienced by the catheter on insertion into a body cavity; said generated liquid medicament and/or lubricant flow from the catheter, being produced by the said differential thermal expansion and persisting for hundreds of hours, thereby providing the functions of self-sterilization, self-lubrication, and self-cleansing.

4,186,746

BODY WARMING DEVICE

William H. Byler, 804 Village La., Winter Park, Fla. 32792, assignor to William H. Byler and Thelma T. Byler, Trustees of William H. Byler Revocable Trust, Winter Park, Fla.

Filed Jan. 16, 1978, Ser. No. 870,012
Int. Cl.[2] A61F 7/00
U.S. Cl. 128—403 11 Claims

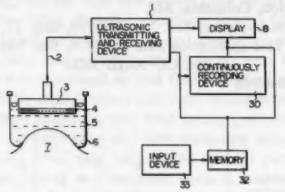


1. A body warming device which comprises in combination:
(A) a housing containing a water compartment and a salt compartment, said salt compartment having segmented chambers in stacked arrangement each containing salt which reacts exothermically with water;
(B) a plurality of water conveying tubes interconnecting the water compartment and the salt compartment, said tubes extending between said water compartment and the lowest of said segmented chambers to deliver water first to the lowest of said chambers then to higher chambers in succession;
(C) an air relief tube interconnecting the salt compartment and the water compartment; and,
(D) means for controllably supplying water from the water compartment to the salt compartment.

4,186,747
ULTRASONIC DIAGNOSING APPARATUS

Kazuhiro Iinuma, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Jul. 29, 1977, Ser. No. 820,148
Claims priority, application Japan, Jul. 30, 1976, 51/90183
Int. Cl.[2] A61B 10/00
U.S. Cl. 128—660 18 Claims



1. An ultrasonic diagnosing apparatus for examining a subject comprising:

an ultrasonic probe having a linear array of closely spaced electroacoustic converters for transmitting a plurality of ultrasonic beams to the subject, sensing the ultrasonic beams reflected from the subject and converting the received ultrasonic beams to electric, tomographic signals,

means for electronically activating the electroacoustic converters to effect repeatedly a plurality of sequential, high-speed electronic, ultrasonic scans along the direction of the linear array,

means for continuously moving the ultrasonic probe in a direction substantially broadside to the linear array during the period that the activating means effects said scans,

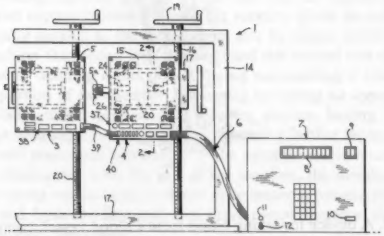
means for processing the electric, tomographic signals from the electroacoustic converters to form sequentially from the electric, tomograhic signals representing each scan a respective planar, B-mode tomographic image in a plane parallel to the beams transmitted by the array of electroacoustic converters, and

means for recording the plurality of planar B-mode tomographic images as they are formed by said processing means to obtain a three-dimensional representation of the subject.

4,186,748
THERMOGRAPHIC APPARATUS FOR PHYSICAL EXAMINATION OF PATIENTS

Kenneth J. Schlager, 12825 Elmwood Rd., Elm Grove, Wis. 53122

Filed Feb. 6, 1978, Ser. No. 875,527
Int. Cl.[2] A61B 5/00
U.S. Cl. 128—736 11 Claims

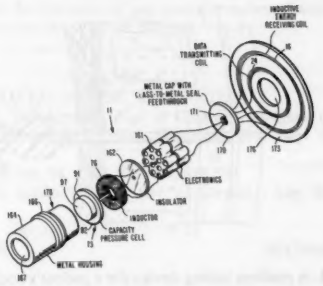


1. A physiological thermographic detection apparatus comprising first and second multiple sensor array means each defining a sensing area, said arrays each including a plurality of individual thermally responsive units located in a selected pattern and developing individual signals related to the thermal state of the body of an aligned patient, a thermally responsive reference unit, support means, mounting means securing said array means to said support means and including adjustment means for independently positioning each of said arrays relative to each other and with respect to said reference unit, a digital memory means, reading means for recording of the individual signals in said memory means, means for processing of said signals in accordance with a spatial pattern recognition program within each array and in one array relative to the other and in the first and second arrays relative to said reference unit to produce an automatic determination of the significance of said signals, and means for displaying of an encoded signal indicative of the diagnostic result of the pattern recognition process.

4,186,749
INDUCTION POWERED BIOLOGICAL RADIOSONDE

Thomas B. Fryer, Saratoga, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 12, 1977, Ser. No. 796,256
Int. Cl.[2] A61B 5/00
U.S. Cl. 128—748 2 Claims



1. A detector for measuring intracranial pressure at a subject's dura and adapted to function in proximity to a source of electromagnetic energy, said detector comprising:

an oscillator with an L-C resonant circuit, said C of said resonant circuit comprising a capacitance-type pressure transducer, said transducer having a first electrode comprising a pressure-responsive diaphragm and a second fixed electrode opposite said first electrode, said diaphragm being a stiff metal disc hermetically sealed to one end of a metal tubular body, said diaphragm having a stiffness at least as great as 10 torr per micron, the frequency of said oscillator being the direct function of the intracranial pressure sensed by said diaphragm when said diaphragm contacts said subject's dura;

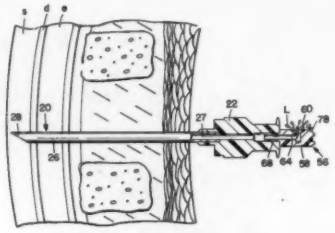
a second resonant circuit having a data transmitting coil and a capacitor;

a buffer having an input with a high impedance and an output with a low impedance, said oscillator being coupled to said buffer input and said data transmitting coil being coupled to said buffer output;

a cylindrically-shaped metal housing having a band of threads on the outer surface thereof said housing having a diameter larger than said transducer, said transducer being sealed to one end of said housing with said diaphragm and part of said tubular body projecting outside of said housing, the housing surrounding said transducer forming a shoulder, said diaphragm being a distance X from said shoulder, means for sealing the other end of said housing, said oscillator, said capacitor of said second resonant circuit, said buffer and said converting means all being hermetically sealed within said metal housing;

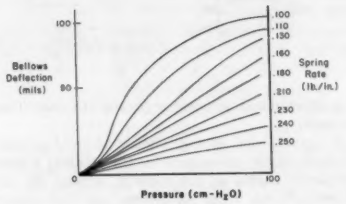
a collar with internal threads;
means for fastening said collar to a patient's cranium;
a sleeve with external and internal threads, said external threads adapted to mate with said collar threads, said internal threads adapted to mate with said housing threads, said sleeve having an end plate with an inner and an outer surface and a centrally located aperture slightly larger than said diaphragm, said aperture permitting a user to see when said sleeve has been advanced in said collar to the position where the end plate outer surface is flush with said subject's dura, said end plate being X thick so that said transducer diaphragm will be flush to said outer surface of said sleeve and plate when said housing is screwed all the way into said sleeve and said shoulder touches said inner surface.

4,186,750
POSITION TESTING DEVICE
Bhupendra C. Patel, Elgin, Ill., assignor to The Kendall Company, Boston, Mass.
Continuation of Ser. No. 680,959, abandoned. This application Apr. 19, 1978, Ser. No. 897,964
Int. Cl.[2] A61B *10/00*
U.S. Cl. 128—748 **4 Claims**



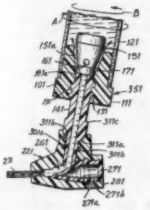
1. A position testing device for a patient's body, comprising:
an elongated tubular member having a lumen, a proximal end, and a distal end for placement in the patient's body; and
a body member having a proximal end, a distal end, an outer surface defining an exterior of the body member, a shallow dish-shaped cavity recessed from said outer surface and exposed to the atmosphere to receive a testing liquid, an elongated tubular section at the distal end of the body member and being releasably received in the proximal end of the tubular member, said body member having a passageway communicating between a first opening at an inner portion of said cavity and a second opening at the distal end of said tubular section such that the passageway communicates with the lumen of the tubular member through said second opening, said passageway intermediate said first and second openings incuding a substantially linear portion and being closed to the exterior of the body member, said passageway being unobstructed intermediate said openings to permit passage of fluid in opposite directions between said first and second openings, said body member being capable of orientation in a testing position while attached to the tubular member and while said passageway linear portion is in a generally horizontal configuration with the cavity being exposed in a generally vertical direction above the body member, said cavity tapering toward said first opening, said cavity having a height between said first opening and said outer surface substantially less than the length of said linear passageway portion, and said cavity having a maximum width adjacent said outer surface substantially greater than the maximum height of the cavity in said testing position, whereby the testing liquid indicates whether the tubular member communicates with a positive or negative pressure inside the patient's body.

4,186,751
NON-INVASIVE, PRESSURE SENSOR APPARATUS FOR COMMUNICATING PRESSURE INSIDE A BODY TO THE EXTERIOR THEREOF
Lewis Fleischmann, Randallstown, Md., assignor to Hittman Corporation, Columbia, Md.
Continuation-in-part of Ser. No. 726,798, Sep. 27, 1976, abandoned. This application Jan. 31, 1978, Ser. No. 873,904
Int. Cl.[2] A61B *5/00*
U.S. Cl. 128—748 **18 Claims**



1. A pressure sensor apparatus for indicating pressure in the body comprising a housing, a gold-plated nickel bellows contained within said housing, said bellows having a plurality of convolutions and a length over the convoluted portion of substantially 0.410 inch, a wall thickness substantially within the range of 0.00025 to 0.00033 inch, and an average spring rate of substantially 0.130 to 0.242 pounds per inch, wherein the mean cross-sectional area of said bellows is substantially 0.005 square inches, means for placing said bellows in communication with said pressure in the body so that said pressure will cause said bellows to expand and contract linearly as a function of said body pressure substantially 24.5 to 45.5 mils, and means contained within said housing and associated with said bellows for communicating the linear movement of said bellows to a receiver means located external to said body to provide data indicative of said pressure.

4,186,752
DEVICE FOR TAKING BLOOD AND FOR INJECTING MEDICATION
Luis A. Guerra, 715 Park Ave., New York, N.Y. 10013
Filed Aug. 30, 1978, Ser. No. 938,155
Int. Cl.[2] A61B *5/14*
U.S. Cl. 128—766 **9 Claims**



1. A device for taking blood from a blood vessel, comprising a support portion having a passage therethrough, a cannula at the distal end of said support portion, an evacuable container portion, elastic stopper means in the distal end of said evacuable container portion and disposed for rotation therewith, tube means passing through said stopper means, said support portion having a socket at the proximal end of said passage, the distal end of said tube means hereinafter termed "tip", being

shaped to join with said socket for forming a continuous passage through said tube means and said support portion, said stopper means and the proximal end of said tube means forming a first valve means for gradually connecting the passage in said tube means with the interior of said container portion by rotation of said container portion in a first direction relative to said tube means, said tip being shaped to join with said socket by rotation in said first direction and to present a first resistance in joining said tip with said socket, said proximal end of said tube means being shaped for passing from a fully seated position to a partly seated position and thence gradually to a position in which said valve means is fully open when said container portion is rotated in said first direction, said valve means being fully closed when said tube means is in the fully and partly seated positions, said tube means presenting a second resistance, greater than said first resistance, when moving said tube means from said fully-seated to said partly-seated position by rotation of said container portion, said tube means and said evacuable container portion being essentially coaxial, whereby inserting said tip in said socket when said tube means is fully seated, and continuously rotating said container in said first direction first joins said tip to said socket, and only then moves said tube means from fully-seated to partially seated position, whence the valve means can be opened to any selected extent by further rotation in said first direction, thereby insuring that said container portion is joined to said support before said first valve means is opened.

4,186,753

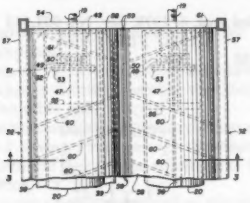
MATERIAL FLOW RETARDERS

Robert R. Todd, Leola, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Jul. 14, 1978, Ser. No. 924,547

Int. Cl.[2] A01F *12/18*

U.S. Cl. 130—27 T **12 Claims**



1. In a crop harvesting and threshing machine having a mobile frame with a longitudinal axis, at least one threshing and separating member having a first end and an opposing second end supported on the frame for rotation about an axis substantially parallel to the longitudinal axis by means including a shaft on the second end, the shaft and the second end of the member defining a junction, a casing surrounding a substantial portion of the member, the casing including an upper substantially closed portion and a lower portion having a discharge area adjacent the junction, the casing further having an end wall positioned rearwardly of the junction and in intersecting relationship with the axis of the member, the member and the casing cooperating to direct crop material toward the second end from the first end, and drive means therefor, the improvement comprising:

crop material flow inhibiting means attached to the upper portion of said rotor casing adjacent the junction, the inhibiting means decelerating and redirecting the crop material toward the discharge area prior to the crop material reaching the end wall, whereby the crop material is prevented from reaching the junction.

4,186,754

CIGARETTE MANUFACTURE

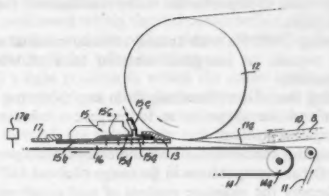
Francis A. M. Labbe, Neuilly-sur-Seine, France, assignor to Molins Limited, England

Filed Jul. 8, 1977, Ser. No. 814,043

Claims priority, application United Kingdom, Jul. 14, 1976, 29222/76

Int. Cl.[2] A24C *5/14*

U.S. Cl. 131—23 A **9 Claims**



1. A cigarette making machine including a tongue by which the tobacco is compressed to its final cross-section, characterised by liquid feeding means formed in the tongue for feeding liquid to a surface of the tongue in contact with the tobacco to dilute and reduce the viscosity of any gum from the tobacco which comes into contact with the tongue.

4,186,755

TOBACCO DRYING APPARATUS

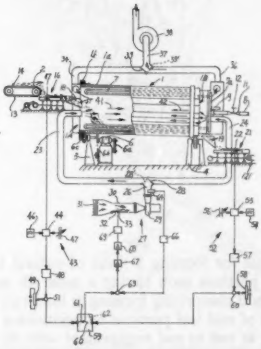
Herbert Schmidt, Glinde, Fed. Rep. of Germany, assignor to Hauni-Werke Körber & Co. KG, Hamburg, Fed. Rep. of Germany

Filed Jul. 14, 1977, Ser. No. 815,500

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1976, 2638446

Int. Cl.[2] A24B *3/10, 3/12*

U.S. Cl. 131—135 **15 Claims**



1. Apparatus for drying tobacco, comprising a conditioning unit having an inlet and an outlet; means for feeding tobacco into said inlet; means for effecting the movement of tobacco from said inlet to said outlet; means for receiving conditioned tobacco from said outlet; at least one source of fluid heating medium; means for conveying heating medium from said source to said inlet; means for conveying heating medium from said source to said outlet; and switchover means operative to connect said source with said first mentioned conveying means while sealing said source from said last mentioned conveying means and vice versa whereby the tobacco in said conditioning unit is respectively dried by heating medium which flows only from said inlet toward said outlet and vice versa.

4,186,756

METHOD OF PROCESSING SMOKING COMPOSITION

Nagaaki Takemoto; Teruo Sakurai; Kimio Mashiko, and Harumatsu Tomari, all of Yokohama, Japan, assignors to The Japan Tobacco & Salt Public Corporation, Japan

Filed Jun. 1, 1977, Ser. No. 802,419
Claims priority, application Japan, Jun. 15, 1976, 51-69316
Int. Cl.[2] A24B *3/14;* A24D *1/18*
U.S. Cl. 131—140 C 17 Claims

1. Method of processing smoking composition having an equilibrium value to improve the water-resistance of the same which comprises:

(a) admixing CMC-Na with natural tobacco material and/or either organic or inorganic material each of which is combustible,

(b) forming the mixture resulting from step (a) into a sheet-like or rod-like shape so as to prepare a conventional smoking composition,

(c) heating the conventional smoking composition prepared in step (b) at a temperature in the range of about 110°–240° C., whereby the moisture content of said composition is reduced to not more than 1%, and

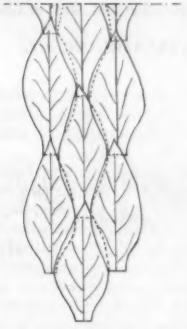
(d) returning the moisture content of the smoking composition heating-processed at step (c) to the equilibrium value.

4,186,757

PROCESS FOR FORMING A LARGE SHEET OF NATURAL TOBACCO FOR MANUFACTURING PARTICULARLY CIGAR WRAPPERS

Rene Bornsztein, Antony, France, assignor to Service d'Exploitation Industrielle des Tabacs et des Allumettes, Paris, France

Filed Aug. 17, 1977, Ser. No. 825,385
Claims priority, application France, Aug. 20, 1976, 76 25344
Int. Cl.[2] A24B *3/00*
U.S. Cl. 131—149 11 Claims



1. A process for forming a sheet of natural tobacco from tobacco leaf portions each having a main rib and secondary ribs, the method comprising forming at least two substantially parallel rows of said leaf portions by positioning leaf portions for each row in end to end engagement with the main ribs of the leaf portions extending lengthwise of the respective rows and positioning the rows such that parts of the leaf portions of one row overlapp complementary parts of the leaf portions of an adjacent row and securing said overlapping complementary parts to each other to form said sheet.

4,186,758

VEHICLE CANOPY

Harold Bridgman, 5317 S. 188th Ct., Aloha, Oreg. 97005

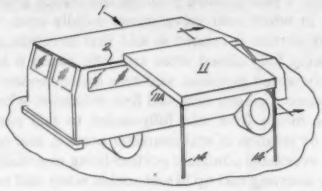
Filed Jun. 16, 1978, Ser. No. 916,792
Int. Cl.[2] E04F *10/06*
U.S. Cl. 135—5 AT 3 Claims

1. A vehicle canopy attachment for disposition outwardly from one side of the vehicle, said canopy comprising,

tubular canopy supporting members,

leg members in supporting engagement at their upper ends with at least one of said canopy supporting members and in ground contact at their lower ends,

C-shaped members each having a flange adapted for abutment with a segment of the vehicle rain gutter, an upright threaded member in adjustable engagement with each C-shaped member, an elongate plate rotatably mounted at one end of said threaded member and adapted for insertion by advancement of said threaded member into a



segment of rain gutter and into abutting engagement therewith whereby said flange of each C-shaped member and said plate of each threaded member are securely and oppositely abutted against a length of rain gutter, each threaded member terminating at its remaining end in a circular retainer for disposition above the rain gutter and within which one of said canopy supporting members is insertably engageable, and

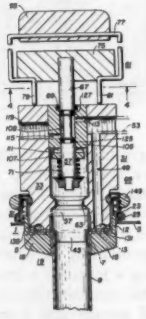
a canopy for supported placement over said tubular members.

4,186,759

CLOSED SYSTEM QUICK COUPLING HEAD ASSEMBLY

James S. Stevenson, Oakland, and John J. Rodriques, Orinda, both of Calif., assignors to Terminator Products, Inc., Oakland, Calif.

Filed Aug. 4, 1978, Ser. No. 931,163
Int. Cl.[2] F16K *19/00*
U.S. Cl. 137—240 7 Claims



1. A coupling head assembly for coupling a container in a closed system, said coupling head assembly including a coupling head having an end portion adapted for insertion into an opening in such container, said coupling head having a main flow passageway therethrough, extending from the insertable end of said coupling head, for flow connecting such container in a closed system to a hose line for withdrawing chemical from such container, a valve seat in said main flow passageway, a main valve in said main flow passageway adapted to engage said valve seat to block said passageway, means normally urging said main valve into engagement with said valve seat, means for removing said valve from its valve seat to open

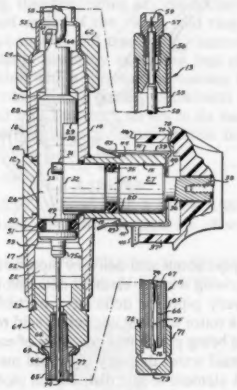
said valve, alternate rinse passageways in said coupling head, one of said rinse passageways terminating at the insertable end of said coupling head for communication with the interior of such container for rinsing the same, the other of said rinse passageways terminating in said main passageway, downstream of said main valve, for supplying rinse liquid to said main flow passageway for rinsing of at least one hose line of such closed system, and means for switching said rinse passageways with respect to a source of rinse liquid, in response to opening and closing of said main valve.

4,186,760

FUEL CONTROL ASSEMBLY FOR BURNERS

Thomas C. Hastings, Willowdale, Canada, assignor to The Coleman Company, Inc., Wichita, Kans.

Filed Jan. 10, 1978, Ser. No. 868,399
Int. Cl.[2] F23D *11/38, 13/28*
U.S. Cl. 137—244 **7 Claims**



1. An improved fuel control assembly for a fuel burning apparatus comprising:

(a) an elongated valve body having first and second ends and a fuel passage extending axially therethrough from one end to the other end,

(b) a fuel inlet conduit connected to the first end of the valve body and having a fuel passage therethrough communicating with the fuel passage of the valve body and a fuel inlet orifice,

(c) a fuel outlet conduit connected to the second end of the valve body and having a fuel passage therethrough communicating with the fuel passage of the valve body and a fuel outlet orifice,

(d) a movable valve closure member axially slidably mounted within the valve body,

(e) a control member rotatably mounted on the valve body for rotation about an axis extending perpendicularly to the direction of sliding movement of the valve closure member,

(f) crank means connecting the control member and the valve closure member for reciprocating the valve closure member within the valve body as the control member rotates,

(g) valve means on the valve closure member and the valve body for closing the fuel passage through the valve body when the valve closure member moves toward the second end of the valve body beyond a predetermined sealing point in the valve body and for opening the fuel passage through the valve body when the valve closure member moves toward the first end of the valve body beyond said predetermined point,

(h) inlet restricting means extending through the fuel inlet conduit and being connected to the valve closure member for movement therewith as the valve closure member reciprocates for restricting the fuel inlet orifice, and

(i) outlet cleaning means extending through the fuel outlet conduit and being connected to the valve closure member for movement therewith in all positions of the closure member as the valve closure member reciprocates for cleaning the fuel outlet orifice, the valve closure member being movable by the control member in the direction extending from the second end of the valve body to the first end of the valve body from:

(1) a clean position in which the outlet cleaning means is positioned within the fuel outlet orifice of the fuel outlet conduit and the valve means closes the fuel passage through the valve body, to

(2) a light position in which the outlet cleaning means is positioned out of the fuel outlet orifice of the fuel outlet conduit and the valve means opens the fuel passage through the valve body and the inlet restricting means is positioned within the fuel inlet orifice of the fuel inlet conduit for restricting flow of fuel through the fuel inlet orifice, to

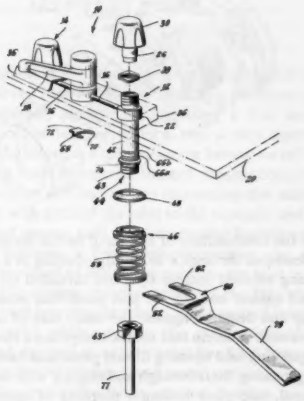
(3) a run position in which the outlet cleaning means is positioned out of the fuel outlet orifice of the fuel outlet conduit and the valve means opens the fuel passage through the valve body and the inlet restricting means is positioned out of the fuel inlet orifice of the fuel inlet conduit.

4,186,761

QUICK-RELEASE SYSTEM FOR MOUNTING A FAUCET ASSEMBLY

Carmine Guarnieri, P.O. Box 373, Fairfield, Conn. 06430

Filed May 15, 1978, Ser. No. 906,258
Int. Cl.[2] F16L *5/00*
U.S. Cl. 137—315 **18 Claims**



1. A quick-release system for mounting and demounting a faucet assembly on a wall structure having an opening therein, said assembly including a valve positionable on and operable from one side of said wall structure adjacent said opening and being connected to a source of fluid located on the other side of said wall structure; said system comprising:

an escutcheon mounted in fixed relation with said valve to be located on said one side of said wall structure, said escutcheon being configured to prevent passage of it and, therefore, said valve through said opening;

an elongate, sustantially inextensible, tubular stem, secured at one end in fixed relation to said valve and said escutcheon and providing fluid communication between said valve and said source of fluid, said stem being configured to extend through said opening with its free end, opposite

said one end, spaced from said other side of said wall structure;

washer means engagable against said other side of said wall structure and configured to prevent its passage through said opening;

retainer means, generally radially mountable on and generally radially demountable from said stem in a fixed axial position relative thereto intermediate said free end and said other side of said wall structure;

platform means secured to said stem forming a shoulder that projects generally radially from the axis of said stem and faces toward said one end of said stem;

spring means compressible between said retainer means and said washer means to urge said washer means to engage said other side of said wall structure thereby confining said wall structure between said escutcheon and said washer means to hold the valve in its operable position; and

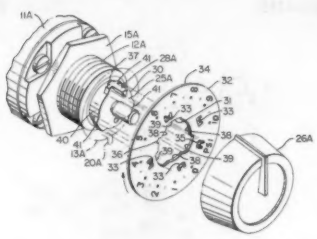
spring lifter means supportable on said shoulder for compressing said spring means against said other side of said wall structure sufficiently to permit mounting of said retainer means on said stem and demounting of said retainer means from said stem.

4,186,762

CONTROL DEVICE MOUNTING MEANS AND PARTS THEREFOR

George T. Hardin, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Sep. 18, 1978, Ser. No. 943,666
Int. Cl.[2] F16L *3/00*; G12B *9/00*
U.S. Cl. 137—343 10 Claims



1. In the combination of a control device having a threaded cap telescoped through a mounting opening in a control panel and being secured thereto by a nut threaded on said cap and disposed against one side of said panel and means carried by said cap and disposed against the other side of said panel, the improvement wherein said means comprises a substantially flat plate spanning said opening of said panel and having a bayonet opening passing therethrough and aligned with said opening of said panel, said plate having a plurality of spaced apart tabs extending therefrom into said opening of said panel, said tabs being disposed outboard of said bayonet opening said cap having a bayonet portion extending completely through said bayonet opening and cooperating with said bayonet opening to lock said cap and plate together.

4,186,763

IRRIGATION SYSTEM

George R. Ferguson, Rte. 2, Clover, S.C. 29710, and Eric D. Freeman, Rte. 1, Box 134, Lake Lure, N.C. 28746

Filed Mar. 20, 1978, Ser. No. 890,716
Int. Cl.[2] B05B *3/12*
U.S. Cl. 137—344 4 Claims

1. A circular irrigation system comprising:

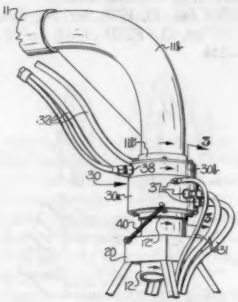
a generally vertical water delivery pipe defining an axis;

a water distribution pipe extending horizontally from and communicating with said delivery pipe;

means supporting said distribution pipe for rotation about said axis and including hydraulic fluid operated drive motor means movable with said distribution pipe for motivating rotation thereof;

hydraulic fluid circulating means mounted stationarily relative to said distribution pipe for circulating a flow of hydraulic fluid to said drive motor means;

conduit means for establishing fluid communication between said circulating means and said drive motor means and including rotary joint means encircling said axis for conducting hydraulic fluid flow between said circulating means and said drive motor means during rotation of said



distribution pipe about said delivery pipe, said rotary joint means comprising a rotor element detachably interposed in said delivery pipe for defining a portion of a water conduit and a stator element encircling said rotor element, said elements being positioned coaxially of each other and coaxially of said water delivery pipe, and means connecting said rotor element to said distribution pipe for rotation therewith about the axis of said delivery pipe, said stator element having a plurality of passageways therein and said rotor element also having a plurality of passageways therein communicating with corresponding passageways in said stator element for conducting hydraulic fluid flow therebetween; and

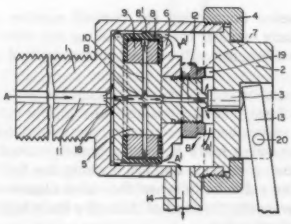
restraining means connected to said stator element for restraining said stator element against rotation.

4,186,764

VALVE FOR CONTROLLING LIQUID FLOW

Odd Ottersen; Egil S. Solvang, both of Oslo, Norway, and Endre Røsjø, London, England, assignors to Ole Gunnar Selvaag, Oslo, Norway

Filed Jul. 22, 1977, Ser. No. 818,198
Claims priority, application Norway, Jul. 22, 1976, 762569
Int. Cl.[2] F16K *31/18*
U.S. Cl. 137—414 6 Claims



1. A valve for controlling the fluid flow from an inlet of a

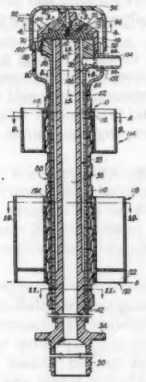
closed valve housing to an outlet thereof, characterized in that between said inlet and said outlet there is arranged at a distance from the inside of the housing a stationary insert body, through which there extends from said inlet a through channel and from said through channel extend transversely extending cross channels, which open at the inner side of at least one elastic annular ring having a pair of radially inwardly extending legs, said ring surrounding the periphery of the insert body such that said ring, in its inactive position, is spaced from the wall of the valve housing so as to enable flow around said insert between said inlet and outlet of the valve, and a piston which is a sliding close fit through the wall of the valve housing in such a manner that the piston may be brought to lie in sealing engagement against the outlet of the through channel thereby closing said outlet of said through channel, which closing of the through channel outlet will increase the pressure in said channel and thus also in said transverse channels, whereby the pressure against the inner side of the annular ring is increased and said ring is brought to a fluid-tight engagement with the inside of the valve housing, thus preventing any connection between the said inlet and said outlet of the valve, said ring having a U-shaped cross section and said transverse channels opening in between the radially inwardly extending legs of the U, said ring being provided with a surrounding contact bead and said valve housing comprising a unitary cylindrical hollow body closed at one end by a lid which serves to fix said insert body in place and which includes a passage therein for said piston.

4,186,765

LIQUID LEVEL CONTROL VALVE ASSEMBLY

Robert V. Anderson, 3900 Summercrest Dr., Fort Worth, Tex. 76109

Filed Mar. 13, 1978, Ser. No. 885,810
Int. Cl.² F16K *31/28, 33/00*
U.S. Cl. 137—414 **23 Claims**



1. A liquid level control assembly for use in connection with a liquid storage tank having an inlet through which liquid enters the tank under a supply pressure, said assembly comprising:

a valve shiftable between a closed position preventing liquid from entering the tank through said inlet and an open position permitting said entry; and

valve-operating means for operating said valve when the liquid level in said tank drops to a lower predetermined level and for then reclosing the valve when the liquid level rises to an upper predetermined level,

said valve-operating means including a float for closing said valve when the liquid level reaches said upper predetermined level and gravity-operated means so disposed with respect to said float as to open said valve when the liquid level drops to said lower predetermined level,

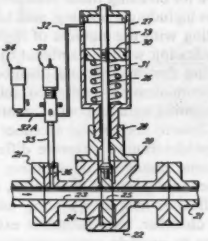
said gravity-operated means being adjustably coupled with said float and said valve in such manner as to permit selective adjustment of said lower predetermined level independently of the location of said upper predetermined level.

4,186,766

FLOW LINE CONTROL SYSTEM

David E. Snyder, Longview, Tex., assignor to U.S. Industries, Inc., New York, N.Y.

Filed Nov. 21, 1977, Ser. No. 853,513
Int. Cl.² F16K *17/00*
U.S. Cl. 137—458 **9 Claims**



1. In a system wherein flow through a line is controlled by a valve which is moved between flow controlling positions by a fluid-operated actuator, apparatus comprising a first sensor having an inlet to the interior thereof and a vent opening connecting with the interior, a second sensor having an inlet to and a vent opening from the interior thereof, means connecting the first sensor inlet to the line, means connecting the interior of the first sensor with each of the inlet to the actuator and the inlet to the second sensor, said first sensor also having valve means shiftable between a first position opening the inlet thereof to admit line fluid to the actuator and to the inlet to the second sensor while closing the connection of the first sensor interior with the vent opening therefrom, and a second position closing the said inlet while opening the connection of the interior to the vent opening so as to exhaust line fluid from said interior through said vent opening, and means yieldably urging the shiftable valve means toward its second position so that said valve means will be shifted from its first to its second position when line pressure within the interior of the first sensor drops below a predetermined value, and said second sensor also having valve means shiftable between positions opening and closing the inlet to the interior thereof, and means yieldably urging said shiftable valve means to its closed position so that, as long as said shiftable valve means of the first sensor is in its first position, said shiftable valve means of the second sensor will not shift to its open position to exhaust line fluid through the vent opening thereof until the pressure of line fluid within the interior of the second sensor has risen to a predetermined value, the drop of fluid pressure within the interior of the first sensor to said predetermined value, due to opening of the shiftable valve means of the second sensor, causing said shiftable valve means of the first sensor to shift to its second position.

4,186,767

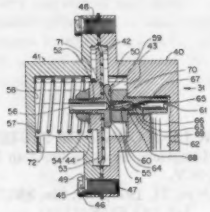
BLEED VALVE PARTICULARLY FOR A MULTI-STAGE COMPRESSOR

Terence Caffrey, Kent, Ohio, assignor to Davey Compressor Company, Cincinnati, Ohio

Continuation of Ser. No. 820,208, is a division of Ser. No. 644,539, Dec. 29, 1975, abandoned. This application Jul. 24, 1978, Ser. No. 927,669

Int. Cl.[2] G05D 7/01

U.S. Cl. 137—501 7 Claims



1. A bleed valve for bleeding fluids between two ambients at different pressures including a housing, said housing having an inlet communicating with the ambient of higher pressure and an outlet communicating with the ambient of lower pressure, said housing having first and second chambers therein, said first chamber communicating with said inlet, said second chamber communicating with said outlet, control means in said housing to allow flow to said second chamber while maintaining a maximum predetermined pressure differential between said first and second chambers irrespective of the pressure differential between said inlet and said outlet, and said control means including flexible means separating said first chamber from said second chamber, passage means extending through said flexible means to provide communication therethrough, and means responsive to the position of said flexible means to control flow from said inlet to said first chamber and from said inlet to said second chamber without flowing through said first chamber.

4,186,768

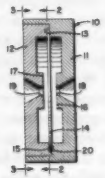
PRESSURE SENSITIVE HYDRAULIC VALVE

Donald W. Kuester, West Hyattsville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 10, 1959, Ser. No. 805,645

Int. Cl.[2] F16K 15/14

U.S. Cl. 137—516.25 10 Claims



1. A sensitive blocking valve device comprising a casing, said casing comprising a pair of half-shell members each including a mating surface at the outer periphery and each having an axial valve seat portion projecting into the interior of said casing and in mutual alignment, an axial orifice through the valve seat portion of each half-shell member, a metallic valve wafer comprising a central valving portion disposed to move to close either of said orifices in said valve seat portions of the casing and having an integral double spiral flat spring formed integrally therewith and extending from said central portion, and an annular portion at the outer periphery of said double spring and formed integrally therewith, said annular portion being disposed in clamped relation between said half-shell members, said wafer including said double flat spring and annular portion all being of the same uniform thickness and planar when the valve device is unoperated.

4,186,769

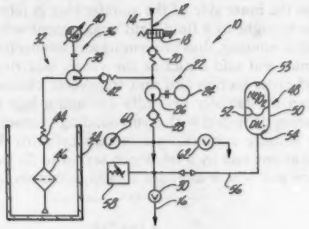
LIQUID MIXING AND DELIVERING APARATUS

Dwight D. Buyce, Hendersonville, N.C., assignor to Chem-Trend, Inc., Howell, Mich.

Filed Jan. 25, 1978, Ser. No. 872,246

Int. Cl.[2] F04B 41/06

U.S. Cl. 137—566 10 Claims



1. Apparatus for mixing a liquid concentrate and a liquid diluent to form a liquid dilution of desired concentration and for delivering the dilution to work stations comprising

a conduit means adapted to be in communication at its upstream end with a source of liquid diluent and at its downstream end with work stations, said conduit means including a first shut-off valve and a primary pump means downstream thereof;

a concentrate supply means including a container for said concentrate, and a metering pump means in communication with said container and with said conduit means at a location between said first shut-off valve and said primary pump means for metering concentrate into the diluent to form said dilution;

accumulator means in communication with said conduit means downstream from said primary pump means for receiving dilution from said primary pump means and returning the same to said conduit means for delivery to said work stations in accordance with preselected pressure conditions; and

control means responsive to one of said preselected pressure conditions for actuating said first shut-off valve to an open position and for actuating simultaneously said metering pump means and said primary pump means so that concentrate and diluent can be caused to flow together toward said primary pump means and discharged therefrom toward said work stations as a dilution of desired concentration.

4,186,770

WASH-HOUSE FITTING INCLUDING A TROUGH

Jan G. H. Zijlstra, Auckland, New Zealand, assignor to AHI Operations Limited, Auckland, New Zealand

Filed Nov. 9, 1976, Ser. No. 740,345

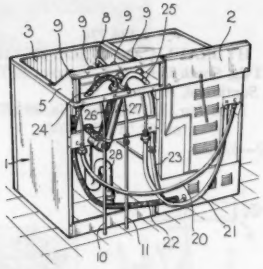
Claims priority, application Netherlands, Nov. 19, 1975, 179293

Int. Cl.[2] E03C 1/01

U.S. Cl. 137—572 6 Claims

1. A wash-house fitting including a trough able to be combined with a washing appliance, the trough having wall means bounding a space for holding liquid and also having a drainage aperture formed in said wall means and provided with a drainage pipe, first and second conduits extending from said wash-

ing appliance and connected to said drainage pipe at first and second positions respectively, said first position being above said second position, and a directional flow control member positionable in said drainage pipe between said first and second positions and having a first condition in which it substantially blocks downward flow of liquid from said first position past said second position while permitting liquid to flow from said first position into the trough, and a second condition in which



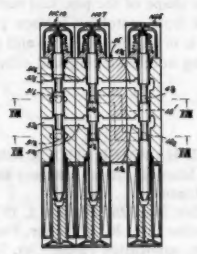
it permits downward flow of liquid from said first position past said second position, whereby a first liquid initially in said washing appliance can be passed through said first conduit to said drainage pipe and then to waste if said directional flow control member is in its second condition but to said trough when said member is in its first position for later return to said washing appliance through said first conduit, and a second liquid may be transferred from said washing appliance to waste through said second conduit and said drainage pipe.

4,186,771

HYDRAULIC CONTROL APPARATUS

Kazumasa Matsumoto, Itami, Japan, assignor to Sanyo Kiki Kabushiki Kaisha, Hyogo, Japan

Filed Nov. 3, 1977, Ser. No. 848,326
Int. Cl.[2] F15B *13/06*
U.S. Cl. 137—596.17 **3 Claims**



1. A hydraulic control apparatus comprising normally opened and normally closed, solenoid operated, spring return type, two-direction, two-position directional control valves, said valves comprising:

(a) a sleeve having a rectangular parallelepipedic cross-section, an upper and lower surface, each being at least partially flat; two opposed lateral surfaces, each being at least partially flat, said sleeve having an axially extending cylindrical void therein and ports including at least one port for communicating said void with one of said surfaces, and at least one common port for communicating each of said lateral surfaces with each other and with said void;

(b) a spool held within said void and being slidably movable therein, said spool having land portions having an external diameter approximately equal to the internal diameter of said cylindrical void, and a reduced portion having an external diameter smaller than the internal diameter of said cylindrical void;

a solenoid mounted on one end of said sleeve;

a U-shaped clamp elastically secured to said sleeve, covering said solenoid;

a conical coil spring mounted on the opposite end of said sleeve from said solenoid; and

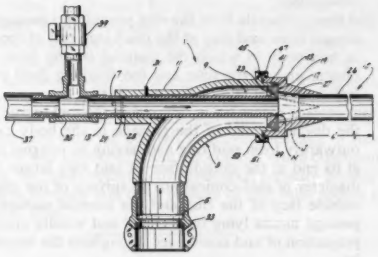
a U-shaped clamp elastically secured to said sleeve, covering said spring, wherein said components are arranged such that said spool is slidably moved within said void by said solenoid in order to open or close communication between at least one of said ports and at least one of said common ports, a plurality of valves being interconnected at said flat surfaces in series through at least one of their respective common ports.

4,186,772

EDUCTOR-MIXER SYSTEM

Avrom R. Handleman, P.O. Box 13151, St. Louis, Mo. 63119

Filed May 31, 1977, Ser. No. 801,620
Int. Cl.[2] F16K *19/00*
U.S. Cl. 137—604 **6 Claims**



1. An eductor-mixer system comprising:

an eductor body having a curved passage extending therethrough for flow of a pressurized working fluid from one end of the passage, constituting an inlet end, to the other end of the passage, constituting a discharge end, said passage being generally of uniform circular cross-section throughout its length;

said body having an opening therein opposite said discharge end of the passage, said opening being coaxial with said discharge end and of substantially smaller diameter than the diameter of said passage;

a nozzle member comprising a ring separate from the body having inside and outside faces and a central opening therethrough from its inside to its outside face, said ring being removably mounted in place at the discharge end of said passage coaxial with said discharge end, said central opening in the ring being of substantially smaller diameter than the diameter of said passage;

a cylindrical tube of substantially smaller diameter than the diameter of said passage extending from outside said body through said opening in the body opposite the discharge end of the passage and extending forward in said passage from the inner end of said opening in the body into the central opening in the ring, said tube being open at its end in said central opening in the ring, said open end of the tube constituting a discharge end;

said tube being axially adjustable in and removable from said opening;

said tube being adapted for connection of its end outside the body to a source of fluent material to be educted and mixed with said working fluid for flow of said material through said tube and out of the discharge end of the tube;

the discharge end of the tube being substantially flush with the outside face of said ring;

the tube being exteriorly tapered at its said discharge end

and thereby having an exterior conical surface convergent in the direction toward its said discharge end with the angle of taper with respect to the axis of the tube less than about 30°;

the inner periphery of the ring bounding the central opening in the ring being formed as a conical nozzle surface extending from the inside face to the outside face of the ring and convergent in downstream direction from the inside to the outside face of the ring;

said conical nozzle surface of the ring surrounding and being spaced from said exterior conical surface of the tube a distance which is small relative to the diameter of the outer end of said conical nozzle surface, thereby providing an annular conical orifice between the exterior

conical surface of the tube and said conical nozzle surface of the ring for delivery of the pressurized working fluid from said passage through said orifice in the form of a hollow conical jet converging in downstream direction from the outside face of the ring;

the gap between the exterior conical surface of the tube and the conical nozzle surface of the ring being relatively small and the length of said orifice being relatively short for rapid acceleration of working fluid flowing through the orifice to a relatively high lineal velocity with low flow losses;

and means separate from the ring providing a passage downstream from said ring at the discharge end of the passage in said body in which the material issuing from the discharge end of the tube and the working fluid conically jetted through said orifice may mix;

said passage means being removably secured to said body at the discharge end of the passage in the body extending outwardly from said ring and having an internal diameter at its end at the outside face of said ring larger than the diameter of said conical nozzle surface of the ring at the outside face of the ring and the internal surface of said passage means lying outward of and wholly clear of the projection of said conical jet throughout the length of the jet.

4,186,773

CONTROL VALVES FOR FLUIDS

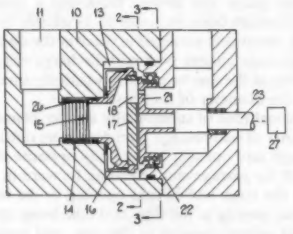
Derek J. Flynn, Solihull, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Jul. 7, 1977, Ser. No. 813,706

Claims priority, application United Kingdom, Aug. 18, 1976, 34374/76

Int. Cl.[2] F16K *39/00*

U.S. Cl. 137—625.3 **11 Claims**



1. A control valve for fluids comprising a body having an inlet and an outlet, a bore through which fluid can flow from said inlet, a control element sealingly slidable in said bore, a port plate including first port means located between said control element and said outlet, means for maintaining opposed faces of said port plate and control element in mutual sliding and sealing engagement in a plane substantially perpendicular to the axis of said bore, a passage through said control element from said bore and opening onto said control element face to define a second port means, means for causing relative sliding between said opposed faces, said sliding resulting in variation of the overlapping areas of said first and second port means, a raised land surrounding one of said port means and defining one of said opposed faces, the cross sectional area of said bore being substantially equal to the sum of the cross sectional areas of one of the port means and of half the area of the face defined by said land so that variations in fluid pressure at said inlet do not materially affect axial force applied to said control element.

4,186,774

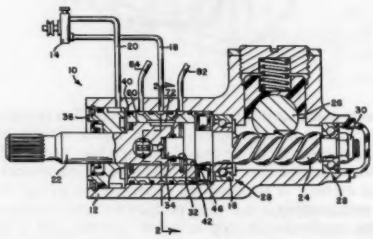
HYDRAULIC CONTROL DEVICE

Alistair G. Taig, South Bend, Ind., assignor to The Bendix Corporation, Southfield, Mich.

Filed Apr. 3, 1978, Ser. No. 892,575

Int. Cl.[2] F15B *9/08*

U.S. Cl. 137—625.23 **2 Claims**



1. In a control device having a rotatable input member, a sleeve having a bore receiving the rotatable input member and at least one pin disposed between the rotatable input member and the sleeve to limit the rotation between the rotatable input member and the sleeve, characterized by the sleeve including a groove and the rotatable input member including a slot opposite the groove, said one pin being disposed within the groove and slot, said slot including a bottom surface which is normally spaced from the pin and including surface portions which are contoured to the shape of the pin, said surface portions being normally spaced from matching surface portions on the pin when the latter is in an idle position, and one of said surface portions including notches facing said other surface portions.

4,186,775

WATER HAMMER SHOCK ABSORBER

Sankichi Muroi, Matsudo, Japan, assignor to Tozen Sangyo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 728,730, Oct. 1, 1976, abandoned. This application Jun. 26, 1978, Ser. No. 918,726

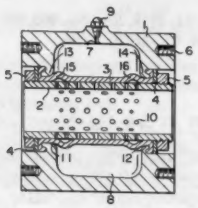
Claims priority, application Japan, Oct. 7, 1975, 50-121143

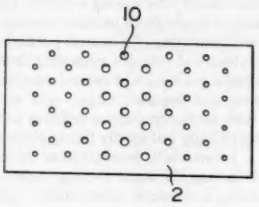
Int. Cl.[2] F16L *55/04*

U.S. Cl. 138—30 **4 Claims**

1. A water hammer shock absorber comprising: a casing forming a cavity adapted to have a pressurized gas sealed therein and provided with two openings, said casing having smoothly curved surface portions at junctures of the openings and the cavity; a pipe extending within the cavity between said two openings and sealed with respect to the casing, said pipe having perforations along its length that vary in area, the total area of said perforations along equal increments of pipe length being greater in a central portion of the pipe and lesser adjacent the two openings of the casing; and an elastic tube covering the perforations of the pipe and sealed about the pipe in a liquid-tight fashion, said tube having annular convex zones within the cavity adjacent each of said two casings openings and a central zone engaging the pipe in one condition of opera-

tion, the central zone being expansible in another condition of operation to a position spaced from the pipe, said annular zones





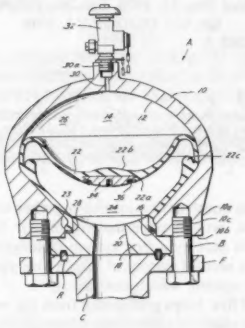
being at least partially in contact with the inner wall of the cavity in both said conditions of operation.

4,186,776

PULSATION DAMPENER OR SURGE ABSORBER

James A. Burton, Houston, Tex., assignor to Hydril Company, Los Angeles, Calif.

Filed Oct. 30, 1978, Ser. No. 955,929
Int. Cl.[2] F16L *55/04*
U.S. Cl. 138—30 **1 Claim**



1. A pulsation dampener for dampening undesired pressure changes in a fluid, including:

a pressure vessel forming a cavity means for receiving and containing fluid under pressure in said cavity means, said pressure vessel having a first opening and a second opening formed therethrough;

an inlet nozzle disposed in said first opening and having a flow passage for permitting ingress and egress of fluid subject to the undesired pressure changes from said cavity means through said flow passage;

a flexible diaphragm disposed in said cavity for dividing said cavity means into a first zone for receiving a first fluid and a second zone for receiving a second fluid, said first zone communicating with said flow passage of said first inlet nozzle;

said second opening communicating with said second zone;

means operably mounted with said pressure vessel for controlling the fluid pressure in said second zone;

means formed on said pressure vessel for securing said pressure vessel with a conduit having the fluid subject to pressure changes for communicating the fluid subject to the undesired pressure changes through said flow passage of said inlet nozzle to said first zone; and

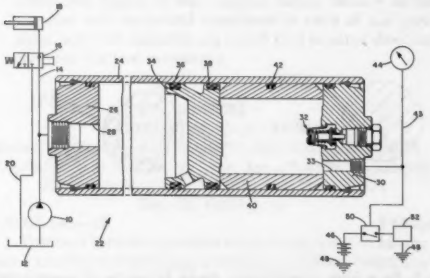
said inlet nozzle sealingly secured to the conduit and said pressure vessel by said means for securing said pressure vessel wherein replacement of said inlet nozzle does not require replacement of said means for securing said pressure vessel; and wherein said diaphragm seals with said inlet nozzle to limit contact of the fluid subject to the undesired pressure changes in the first zone to only the inlet nozzle and diaphragm to protect the pressure vessel from corrosion or flow erosion by the fluid subject to the undesired pressure changes; said diaphragm having a diaphragm pressure reinforcement molded thereon for bridging said flow passage to support said bladder when the fluid pressure in said second zone exceeds the fluid pressure in said first zone to reduce the adverse effect of differential pressure on said bladder; said diaphragm having having having an annular rib formed thereon for forming a radius of curvature for said bladder as the first zone decreases in size relative to the second zone; and wherein said diaphragm pressure reinforcement is a metal disk; and said shock absorbing means including an O-ring mounted with said metal disk; and wherein said means for securing said pressure vessel comprises a collar and polytetrafluoroethylene ring, and maintains said inlet nozzle in sealing engagement with the conduit to prevent leakage of fluid between said inlet nozzle and the conduit when communicating the fluid subject to the undesired pressure pressure changes through said flow passage of said inlet nozzle to the first zone.

4,186,777

PRESSURE VESSEL RETAINED ENERGY MEASUREMENT SYSTEM

Lawrence R. Klope, Cedar Falls, and Robert E. Haight, Waterloo, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Oct. 27, 1978, Ser. No. 955,498
Int. Cl.[2] F16L *55/04*
U.S. Cl. 138—31 **1 Claim**



1. In a hydraulic system having a fluid pump drawing fluid from a fluid reservoir and supplying said fluid to a fluid function through a supply line, a pressure vessel system comprising: a cylindrical housing having first and second open ends; a cylindrical plug member having a port provided therein secured to and closing said first open end of said cylindrical housing, said port fluidly connecting said supply line in said cylindrical housing; a cylindrical cap member having first and second through holes provided therein secured to and closing said second end of said cylindrical housing; a normally closed gas valve disposed in blocking position in said first through hole operable to allow bi-directional flow of gas through said

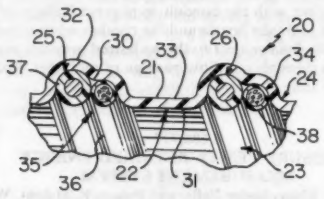
hole; sensing means connected to said second through hole for sensing the pressure of said gas in said cylindrical housing and providing an indication thereof; said sensing means includes a normally-closed pressure switch held open by gas pressure in the cylindrical housing so long as the pressure is above a predetermined value and closable below the predetermined pressure of said gas in said cylindrical housing, and a warning indicator responsive to the closing of said pressure switch to provide an indication thereof; a cylindrical piston slidably disposed in said cylindrical housing between said cylindrical plug member and said cylindrical cap member, said cylindrical piston separating said fluid from said gas; and means disposed between said cylindrical piston and said cylindrical cap member for stopping said cylindrical piston a predetermined distance from said cylindrical cap member and defining a predetermined minimum gas volume.

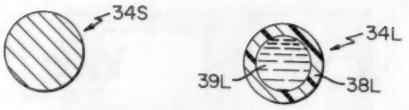
4,186,778

HOSE CONSTRUCTION HAVING INTEGRAL FIRE EXTINGUISHANT AND METHOD OF MAKING SAME

Richard D. Carey, Waynesville, N.C., assignor to Dayco Corporation, Dayton, Ohio

Filed May 30, 1978, Ser. No. 910,922
Int. Cl.[2] F16L *11/12*
U.S. Cl. 138—103 **25 Claims**





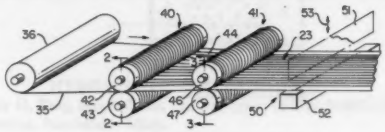
1. In a hose construction made primarily of combustible material and having a tubular inside surface defining a longitudinally extending passage for conveying a fluid therethrough and having an outside surface, the improvement comprising, at least one member which has a fire extinguishing material comprising same, said member being disposed adjacent one of said surfaces, said fire extinguishing material being activated upon subjecting said member to combustion temperatures, said member comprising an independent tube having an enclosing wall made of a combustible material and containing a fire extinguishing material therein, said fire extinguishing material being exposed and free to act upon destruction of said enclosing wall by subjecting same to said combustion temperatures.

4,186,779

CORRUGATED METAL TUBE

William T. Wagner, Dayton, Ohio, assignor to Dayco Corporation, Dayton, Ohio

Filed May 12, 1978, Ser. No. 905,487
Int. Cl.[2] H02G *3/04*
U.S. Cl. 138—121 **1 Claim**



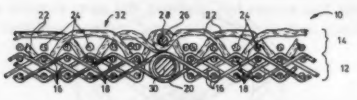
1. A corrugated ferrous metal tube having a central longitudinal axis and comprising, a single piece member having equal thickness throughout and consisting of a central portion and a pair of right circular cylindrical portions extending from the opposite ends of said central portion, said central portion having integral corrugations and opposed edges, said member being in tubular form with said corrugations defining substantially annular alternating radially outwardly facing projections and channels having a substantially semi-circular cross-sectional outline and each having the same average radius, said cylindrical portions having a diameter substantially equal to the diameter of said channels; said opposed edges disposed immediately adjacent each other, each of said edges disposed in abutting relation in an associated plane extending along a mean path substantially parallel to said axis, and a butt weld defined by fusing together the metal defining said opposed edges and fixing said edges together.

4,186,780

SEAM CONSTRUCTION FOR MULTI-LAYER FELTS

Michael J. Josef, Clifton Park, and Eric R. Romanski, Delmar, both of N.Y., assignors to Albany International Corp., Albany, N.Y.

Filed Dec. 15, 1978, Ser. No. 969,989
Int. Cl.[2] D03D *25/00, 3/04*
U.S. Cl. 139—383 A **10 Claims**



1. A pin seam construction joining together the two ends of a multi-layered, woven papermakers felt or forming fabric characterized in part by a first system of lengthwise yarns in one layer and a second system of lengthwise yarns positioned above the first system, which comprises;

a plurality of first loops protruding from the two ends of the fabric on a plane co-extensive with the plane of the lengthwise yarns in the first system of lengthwise yarns;

a plurality of second loops, protruding from the two ends of the fabric on a plane co-extensive with the plane of the lengthwise yarns in the second system of lengthwise yarns;

said loops being anchored in the body of the felt or fabric;

said loops in one end being alternately displaced in respect to the loops of the other end so that the loops of the one end will interleaf with the loops of the other end when the ends are brought together to form a seam at the interleafed loops;

a first pintle through the plurality of interleafed first loops; and

a second pintle through the plurality of interleafed second loops;

said pintles joining the interleafed loops in a seam construction.

4,186,781

NETWORK STRUCTURES AND METHODS OF MAKING SAME

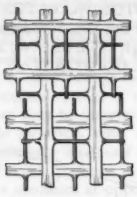
Charles W. Kim, Wilmington; Chia-Seng Liu, and Richard MacDuff, both of Newark, all of Del., assignors to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 750,982, Dec. 15, 1976, Pat. No. 4,101,358, which is a division of Ser. No. 590,664, Jun. 26, 1975, which is a division of Ser. No. 324,028, Jan. 16, 1973, Pat. No. 3,922,329. This application Apr. 14, 1978, Ser. No. 896,547

The portion of the term of this patent subsequent to Nov. 25, 1992, has been disclaimed.

Int. Cl.[2] D03D *15/00*

U.S. Cl. 139—420 R **2 Claims**



2. A woven fabric comprising a plurality of tapes each tape having two or more parallel continuous uniaxially oriented main filaments interconnected in a predetermined uniform spaced relationship by a plurality of transverse discontinuous parallel tie filaments, no substantial portion of which crosses over the main filaments, each of said tie filaments between each pair of adjacent main filaments having its longitudinal axis in axial alignment with the longitudinal axis of the adjacent tie filament, and each tape having portions of tie filaments protruding from the edges thereof, said tapes being woven together to provide a woven fabric having a predetermined porosity.

4,186,782

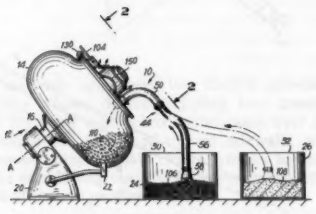
PORTABLE ARRANGEMENT FOR AND METHOD OF TRANSFERRING MATERIALS BETWEEN OPEN-MOUTHED CONTAINERS

Lou Scharf, 240 Central Park South, New York, N.Y. 10019

Filed May 22, 1978, Ser. No. 908,051

Int. Cl.[2] B65B *31/00*

U.S. Cl. 141—7 **10 Claims**



1. A portable arrangement for reversibly transferring materials in either direction between open-mouthed containers, at least one of said containers being a mixing drum for receiving solid materials to be coated and coating materials, comprising:

(a) portable cover means for removably sealingly engaging the respective mouths of at least two containers, said cover means including

(i) a portable frame having an access opening, and

(ii) a sealing member mounted on said frame for movement together with the latter between a loading position in which said sealing member covers and sealingly engages the mouth of one of said containers while leaving another of said containers uncovered, and an unloading position in which said sealing member covers and sealingly engages the mouth of said other container while leaving said one container uncovered;

(b) elongated conduit means for communicating between the respective interiors of said covered and said uncovered containers, said conduit means having

(i) one end region mounted on said frame for movement together with the latter and communicating with the interior of the respectively covered container, and

(ii) another end region in communication with and movable relative to said one end region of said conduit means for entry through the mouth of the respectively uncovered container into the interior of the latter;

(c) means for moving material from the interior of said uncovered container to the interior of said covered container in each position of said cover means, said material-moving means including

(i) suction transfer means mounted on said frame for movement together with the latter and operative in each position of said cover means for generating within the respectively covered container a pressure which is lower than the pressure within the respectively uncovered container, said pressure differential being operative for loading material from said other container through said conduit means to said one container in said loading position, and for unloading material from said one container through said conduit means to said other container in said unloading position,

(ii) said suction transfer means including a vacuum pump having a suction inlet opening in communication with said access opening of the frame, an electrical motor drive for the pump, and adjusting means electrically connected to said motor for adjusting the transfer rate of the materials to be transferred during loading and unloading by electrically controlling said motor drive;

(d) filtering means at said access opening for preventing entrance of undesired contaminants through said openings to said vacuum pump in each position of said portable cover means; and

(e) handle grip means mounted on said frame for reversing the orientation of said suction transfer means and said other end region of said conduit means relative to the covered and uncovered containers in each of said positions, whereby materials are transferred in either direction between the two containers.

4,186,783

CHEMICAL INJECTOR

Michael W. Brandt, P.O. Box 1092, Stillwater, Okla. 74074

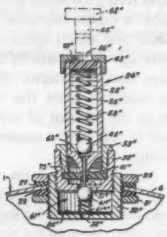
Continuation of Ser. No. 462,364, Apr. 19, 1974, abandoned. This application Jan. 26, 1976, Ser. No. 652,372

Int. Cl.[2] B65B *3/32*

U.S. Cl. 141—18 **5 Claims**

1. Pesticide sprayer apparatus comprising: a sleeve having a bore extending therethrough forming a chamber containing a premeasured quantity of liquid pesticide; a conically-shaped lower end on said sleeve having a passage extending through said conically-shaped lower end; valve means in said passage, said valve means being moveable between a first position preventing flow of liquid from said chamber through said passage and a second position permitting flow of liquid through said passage; a container, said container having an upper end and a lower end; an air pump on said container, said air pump being adapted to deliver pressurized air into said container; a tube; means securing said tube to said container such that a lower end of said tube is positioned inside said container and adjacent the lower end of the container; a hose having one end secured to the upper end of said tube and

another end secured to a spray gun; a valve body on said container, said valve body having a passage through which pesticide is introduced into said container, said passage through said valve body terminating inside said container adjacent the upper end of the container to assure mixing of pesticide introduced into said container with contents of the container before flowing into the lower end of said tube; means detachably securing said sleeve to said valve body, said passage formed in said conically-shaped lower end of said sleeve communicating with said chamber and terminating exteriorally of said sleeve and communicating with the passage in the valve



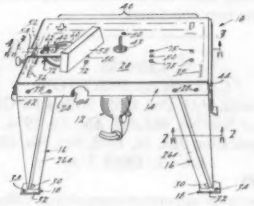
body when said sleeve and said valve body are secured together; seal means on said valve body, said seal means being adapted to prevent leakage of liquid pesticide from said chamber to the outside of the container when said sleeve and said valve body are secured together; a rod in the passage in the valve body positioned to extend into the passage in the conically-shaped lower end of said sleeve to move said valve means from said first position to said second position when said sleeve is secured to said valve body and permitting movement of said valve means from said second position to said first position when said sleeve is not secured to said valve body and means to eject liquid from said chamber into said container.

4,186,784

TOOL TABLE CONSTRUCTION

John T. Stone, Saylorsburg, Pa., assignor to Atlantic Container Corporation, Easton, Pa.

Filed Jul. 21, 1977, Ser. No. 817,630
Int. Cl.[2] B25H *1/02*
U.S. Cl. 144—253 J **20 Claims**



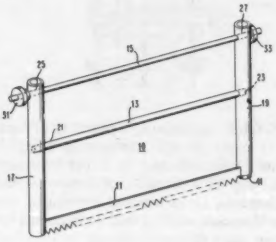
1. A tool table for a plurality of different tool assemblies each having a different type cutting tool, said table comprising a top structure, a plurality of legs secured to said top structure for supporting said top structure, said top structure being a laminated structure comprising a sheet metal base and a hardboard top adhesively secured thereto, said hardboard top having an upper surface defining a working surface for supporting the material to be worked on by the cutting tool, a generally centrally located opening in said top structure, and mounting means for mounting the plurality of different tools to said top structure with the cutting tool being extendable through the opening, said mounting means adapted to be secured to saber saws and routers, said mounting means comprising a generally annular member having an inwardly dished portion with a generally central tool aperture and an outer peripheral flange having a plurality of radially outwardly extending notches therein, first fastening means extending through said notches for removably securing said annular member to the underside of said top structure and below said upper surface with said tool aperture in line with said opening whereby said upper surface alone defines the working surface immediately surrounding the cutting tool of the saber saws and routers, said inwardly dished portion of said annular member having a first plurality of circumferentially distributed slots adapted to receive mounting means for attaching a router to said annular member and a second plurality of circumferentially distributed slots adapted to receive mounting means for attaching a saber saw to said annular member.

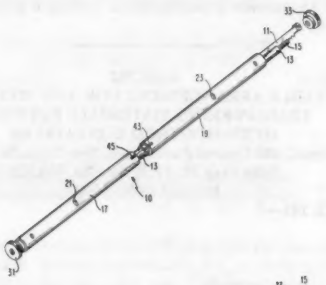
4,186,785

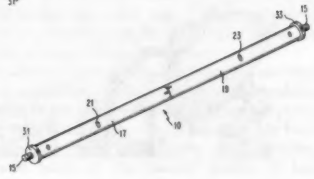
SELF-STORING BUCKSAW

Malvin S. Bilsback, 20 Park Dr., Woodstock, N.Y. 12498

Filed Jul. 24, 1978, Ser. No. 926,871
Int. Cl.[2] B27B *21/00*
U.S. Cl. 145—32 R **3 Claims**







1. A self-storing buck saw assembly having an assembled and a stored condition comprising in combination

a frame including a handle assembly, a compression member and a tension member,

a saw blade of predetermined length,

said handle assembly comprising a pair of hollow tubular handle members of substantially equal size,

one tubular handle member being formed for interconnec-

tion to the other handle member of each said pair to form a carrier assembly for the remainder of said buck saw components,

said tension member comprising a solid rod having screw portions at opposite ends, and

a pair of tension adjustments means associated with opposite ends of said tension rod,

said tension adjusting means comprising a pair of thumb nuts on opposite ends of said tension rod, the outer diameter of each thumb being larger than the inner diameter of each tubular handle member

said blade, tension and compression members being contained within said handle assembly when said buck saw is in said store condition,

said tension adjusting means adjusting the tension of said tension member when said buck saw is in the assembled condition,

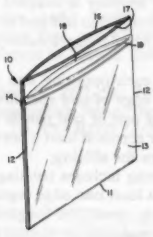
and also functioning as end members of said carrier assembly when said buck saw is in said store condition whereby only those components of said buck saw assembly utilized in said assembled state are utilized in said store state said tension member being longer than the interconnected length of said tubular handle members by the length of said screw portions so that in the stored condition the tension member may be inserted into the interconnected tubular handle members with the said screw portions extending at opposite ends and the thumb nuts screwed down the said screw portions to close the interconnected tubular handle members at opposite ends with the blade and compression member therewithin and retain the handle members in the interconnected carrier condition.

4,186,786

COLORED INTERLOCKING CLOSURE STRIPS FOR A CONTAINER

George F. Kirkpatrick, Downers Grove, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Filed Sep. 29, 1978, Ser. No. 947,040
Int. Cl.[2] B65D *17/20*
U.S. Cl. 150—3 14 Claims



1. A container comprising two flexible sidewalls and an interlocking closure device including two closure profiles operable for being interlocked continuously over a predetermined length and connected to said sidewalls, wherein the improvement comprises said closure profiles having different colors for establishing visually the completeness of the occlusion of said closure profiles.

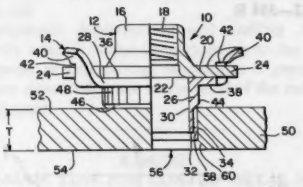
4,186,787

FLOATING ANCHOR NUT ASSEMBLY AND BASKET MEMBER COMPONENT

Ahmed Husain, Union, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed Dec. 28, 1977, Ser. No. 865,028
Int. Cl.[2] F16B *37/00*
U.S. Cl. 151—41.73 20 Claims

1. A basket member for use as a component of a rivetless floating anchor nut assembly, said basket member being of one-piece metal construction and having a sleeve portion and a nut member engaging and retaining portion, said sleeve portion adapted to enter an aperture in a workpiece and having a deformable part adapted to be permanently deformed to affix said basket member to said workpiece and said nut member engaging and retaining portion having a bearing surface adapted for slidable engagement with a bearing surface of said nut member and a pair of wings each having a slot there-



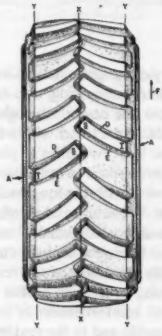
through adjacent said basket member bearing surface, said slots adapted to receive nut member lugs releasably to capture the nut member, said wings being resiliently flexible to permit assembly and disassembly of a nut member with and from said basket member an indefinite number of times, said basket member having a hardness in the range of which the lower limit is 34 on the Rockwell C scale and the upper limit is 38 on the Rockwell C scale.

4,186,788

PNEUMATIC TIRE

Jean Pommier, Clermont-Ferrand, France, assignor to Compagnie Generale des Etablissements Michelin, Clermont-Ferrand, France

Filed Mar. 2, 1978, Ser. No. 882,783
Claims priority, application France, Mar. 3, 1977, 77 06682
Int. Cl.[2] B10C *11/08*
U.S. Cl. 152—209 B 7 Claims



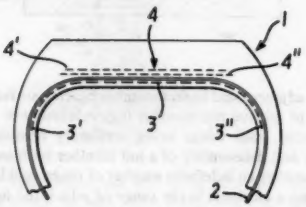
1. A pneumatic tire having a tread with two side edges, a longitudinal plane of symmetry and traction bars with a leading edge and a trailing edge, said traction bars having, with respect to said longitudinal plane of symmetry, an average angle of inclination which is greater at their end adjacent said side edges than at their end adjacent said longitudinal plane of symmetry, said leading edge having a slope more abrupt in the region of said longitudinal plane of symmetry than in the region of said side edges and said trailing edge having a slope more gentle in the region of said longitudinal plane of symmetry than in the region of said side edges.

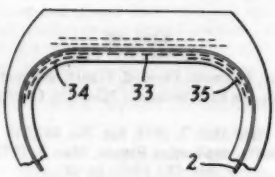
4,186,789

HEAVY-DUTY RADIAL TIRE WITH PLY OF OBLIQUE ELASTIC CORDS RADIALLY INWARD OF THE CARCASS

Henri Verdier, Beauregard-L'Eveque, France, assignor to Compagnie Generale des Etablissements Michelin, France

Continuation-in-part of Ser. No. 598,689, Jul. 24, 1975, abandoned. This application May 19, 1977, Ser. No. 798,372
Claims priority, application France, Jul. 25, 1974, 74 25988
Int. Cl.[2] B60C 9/20, 9/10
U.S. Cl. 152—354 R 8 Claims





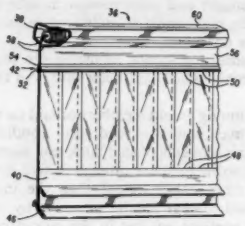
1. A large, heavy-duty pneumatic tire for construction equipment and the like comprising two beads, a continuous carcass extending from one bead to the other and substantially formed of radial cords, and a tread with a tread reinforcement which is formed by at least two plies of parallel cords in each ply in crosswise superimposed arrangement from one ply to the next one and forming with the longitudinal direction of the tire angles of at most 30°, said tread reinforcement being less wide than the tread and located radially outside said carcass to restrain the latter and having a slightly curved meridian profile, said carcass, under the effect of the restraint by said tread reinforcement, assuming a meridian profile which in the region covered by said tread reinforcement is less curved than the normal equilibrium profile and in the region of the shoulders of the tire is more curved than the normal equilibrium profile, said tire comprising also at least one ply of oblique elastic cords which form angles of at most 30° with the radial cords of the carcass, said ply of oblique elastic cords being arranged radially inward of the carcass, extending continuously in the transverse direction of the tire over a width greater than the maximum width of the tread reinforcement, having its two edges located beyond the edges of said tread reinforcement, producing a complementary attenuation of the restraining force of the crown reinforcement, decreasing the curvature of the carcass reinforcement in the equatorial zone of the tire, and increasing this curvature in the region of the shoulders.

4,186,790

ACCESS SHIELD FOR UNCOVERED REFRIGERATED UNITS

M. Allan Schenker, 17046 Burbank Blvd. #16, Encino, Calif. 91316, and Irving J. Kerstein, P.O. Box 404, Calabasas, Calif. 91302

Filed Oct. 3, 1977, Ser. No. 839,731
Int. Cl.[2] E06B 3/80, 9/14
U.S. Cl. 160—329 9 Claims



1. An apparatus for forming a shield across an aperture wherein a temperature gradient is maintained across said aperture while permitting access therethrough, comprising:

a plurality of substantially transparent and resilient panels, each one of said plurality of panels being adjacent to at least one other one of said plurality of panels each one of said plurality of panels assuming an overlapping relationship with at least one other one of said plurality of panels;

means for disposing said plurality of panels across said aperture and tensioning each one of said panels across said aperture said means including at one edge of said aperture a rotatable roller having a torque imparted to said roller by a spring, said roller being coupled to a flexible member, said flexible member being rolled and retractable on one end portion onto said roller and at an opposing end portion said flexible member is coupled to a rigid member which in turn is coupled to one end of each of said plurality of panels for maintaining tension on said plurality of panels;

means for affixing each opposing end of said plurality of panels along one edge of said aperture whereby the parting of an adjacent pair of said panels is operable to draw said rigid member across at least a portion of said aperture toward said means for affixing;

said means for affixing includes rotating means for permitting rotation of at least one edge segment of each of said plurality of panels about the longitudinal centerline of each panel while maintaining tension on each one of said plurality of panels;

said rotating means comprising a freely rotatable holder coupled to an edge segment of one of said panels said holder having a pivot hole and having at least one protrusion extending from said holder, said protrusion having at least a portion offset from said pivot hole;

a receiving fixture having a pivot hole and at least one indentation said indentation for mating and contacting said protrusion on said holder; and

a spring-loaded pivot pin disposed in said pivot hole in said fixture and holder for urging said protrusion into said indentation to return said protrusion and indentation to a configuration of substantially full contact, said contact and mating between said offset portion of said protrusion with said indentation generating a restoring torque whereby said holder and fixture are urged into a realigned configuration;

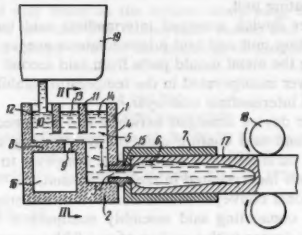
whereby a thermal barrier is formed across said aperture without prohibiting substantially free movement therethrough.

4,186,791

PROCESS AND APPARATUS FOR HORIZONTAL CONTINUOUS CASTING OF METAL

Vladimir T. Sladkoshteev; Oleg A. Shatagin; Samuil F. Khalemsky, and Eleonora B. Besedina, all of Kharkov, U.S.S.R., assignors to Ukrainsky Nauchno, Kharkov and Nauchno Proizvodstvennoe, Tula, both of, U.S.S.R.

Filed Dec. 27, 1976, Ser. No. 754,681
Int. Cl.[2] B22D *11/10*
U.S. Cl. 164—66 6 Claims



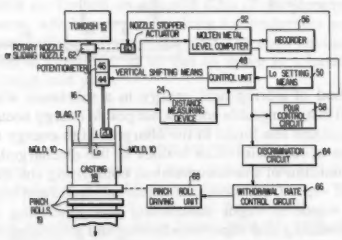
1. A process for horizontal continuous metal casting, comprising the steps of supplying molten metal in a stepped flow through a tundish; blowing through said metal flow a gas which will not react with said metal; and feeding the metal into a horizontally disposed mold; wherein said gas is blown through said metal at a position in said tundish which is above an exit of said tundish where said metal flows into said mold, and said position of the tundish wherein the molten metal flow is being blown through with the gas is substantially isolated from portions of said tundish into which said metal is being fed and from which said metal flows into said mold.

4,186,792

APPARATUS FOR MONITORING AND CONTROLLING THE LEVEL OF THE MOLTEN METAL IN THE MOLD OF A CONTINUOUS CASTING MACHINE

Takeo Yamada; Seigo Ando; Yoshio Miyashita; Katsuhiko Murakami; Masahisa Tate, and Kiyoshi Mizui, all of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 20, 1977, Ser. No. 862,501
Claims priority, application Japan, Dec. 21, 1976, 51-152839
Int. Cl.[2] B22D *11/16*
U.S. Cl. 164—150 1 Claim



1. An apparatus for monitoring and controlling the level of a molten metal in a mold of a continuous casting machine, comprising:

supporting means for positioning detecting means of an eddy-current distance measuring device just above the surface of the molten metal in said mold, said detecting means detecting the surface;

monitoring and controlling means adapted to receive a distance signal generated from said distance measuring device in response to a variation in the level of said molten metal relative to said detecting means for controlling the level of the molten metal in said mold at a predetermined height and for simultaneously displaying said distance signal on a recorder, said supporting means comprising:

a shifting mechanism for vertically moving the detecting means of said eddy-current distance measuring device;

control means for actuating said shifting mechanism in such a manner that the distance signal applied from said distance measuring device is maintained at a predetermined value; and

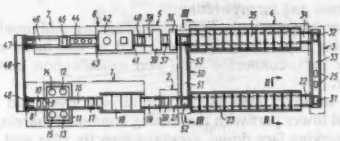
a potentiometer mounted to said shifting mechanism whereby a signal output corresponding to the amount of movement of said shifting mechanism is generated as a distance signal indicative of the level of the molten metal in said mold.

4,186,793

AUTOMATIC LINE FOR COATED METAL MOULD CASTING

Anatoly D. Teplinsky, ulitsa Generala Petrova, 27, korpus 1, kv. 73; Grigory A. Yarovinsky, Treugolny pereulok, 13, kv. 14; Rostislav L. Snezhnoi, ulitsa Bogdana Khmelnitskogo, 36, kv. 12; Savely L. Burakov, Treugolny pereulok, 13, kv. 23; Vladimir S. Serebro, ulitsa Ostrovidova, 88, kv. 1; Yakov M. Ryvkis, ulitsa Garibaldi, 14, kv. 26; Lidia P. Kolienko, ulitsa Tereshkova, 2, korpus 5, kv. 28, all of Odessa; Anatoly I. Bolshakov, ulitsa 25 let Oktyabrya, 92, kv. 52; Vladimir A. Antonov, ulitsa Fitko, 14, kv. 63, both of Tiraspol Moldavskoi SSR; Gerbert G. Tsaizer, prospekt Lenina, 22, kv. 12, Chelyabinsk; Moisei S. Shapiro, pereulok Artilleristov, 2, kv. 8, Chelyabinsk, and Mark M. Pekarsky, ulitsa 40 let Oktyabrya, 28, kv. 123, Chelyabinsk, all of U.S.S.R.

Filed Mar. 17, 1978, Ser. No. 887,532
Int. Cl.[2] B22D *47/00*
U.S. Cl. 164—158 7 Claims



1. An automatic line for casting into coated metal moulds assembled from separate parts thereof, comprising:

a unit for applying a coating to the working surface of said metal mould parts so as to be set thereon, said unit incorporating:

a feed conveyer adapted to deliver said metal mould parts for a coating to be applied to said working surface thereof,

a sand-blowing machine intended for applying a coating to the working surfaces of said metal mould parts, said machine being arranged directly after said feed conveyer,

a first turnover manipulator for turning over said metal mould coated parts, with the working face up, arranged after said sand-blowing machine in the direction of the coating process,

a discharge conveyer connecting said sand-blowing machine with said first turnover manipulator for transferring said coated metal mould parts from said sand-blowing machine to said first turnover manipulator,

a device adapted to provide for additional setting of the coating applied to the working faces of said metal mould parts, arranged directly after said first turnover manipulator and formed as a heating means provided with a first conveyer for transferring said coated metal mould parts from said first turnover manipulator to said heating means;

a unit for assembling a complete mould from said separate coated metal mould parts, arranged in the direction of the

assembly operation directly after said coating unit and incorporating:

a second turnover manipulator for turning over the upper part of an assembled mould with its working face down,

an assembly manipulator for assembling said coated metal mould parts into a complete mould, arranged directly after said second turnover manipulator for turning over the upper part of a coated mould,

a second conveyer connecting said first conveyer incorporated in said device for additional setting of the coating with said second turnover manipulator incorporated in said assembly unit for transferring said coated metal mould parts from said additional coating setting device to said second turnover manipulator;

a unit for pouring molten metal into said assembled mould having an inlet and an outlet, arranged in the direction of the production process after said assembly unit and incorporating:

a third conveyer intended for transferring said assembled moulds in said pouring unit where molten metal is poured while said moulds are on said third conveyer,

a transfer device arranged on each end of said third conveyer for placing said assembled moulds on said third conveyer and removing said moulds therefrom,

a device, including a fourth conveyer connecting said assembly manipulator with said transfer device arranged at the inlet of said pouring unit and including further heating means for maintaining a requisite temperature of said assembled moulds awaiting to be filled with molten metal;

a unit for solidifying a casting inside the mould, arranged directly after said pouring unit and incorporating:

a fifth conveyer adapted to receive and transfer poured-in moulds from said transfer device arranged at the outlet of said pouring unit,

additional heating means arranged on said fifth conveyer of the casting solidification unit and energized upon shutting down of the automatic line as a whole;

a unit for disassembling said mould and removing the casting therefrom, arranged directly after said casting solidification unit and incorporating:

a disassembly manipulator for disassembling said mould and cleaning supercharging holes fitted in said metal mould upper part, connected with said solidification unit conveyer,

a third turnover manipulator for turning over said metal mould lower part with the casting contained therein, with the working face down, arranged directly after said disassembly manipulator,

a manipulator for removing said casting from said lower part of the mould and cleaning said supercharging holes fitted in said mould, arranged directly after said third turnover manipulator for turning said metal mould lower part,

a sixth conveyer connecting said manipulator for removing the casting from said metal mould lower part with third turnover manipulator;

a cleaning unit for cleaning said metal mould parts of any used coating, arranged directly after said disassembly unit and incorporating:

a fourth turnover manipulator for turning over said metal mould parts with their working faces up, connected with said disassembly unit conveyer,

a cleaning device for removing the remnants of the used coating from said metal mould parts, arranged directly after said fourth turnover manipulator incorporated in said cleaning unit,

a seventh conveyer connecting said fourth turnover manipulator incorporated in said cleaning unit with said cleaning device;

a unit for stabilizing the temperature of said cleaned mould parts, arranged directly after said cleaning unit and incorporating:

a device for stabilizing the temperature of said cleaned metal mould parts, formed as a chamber for cooling said metal mould parts,

a fifth turnover manipulator for turning over said metal mould parts with the working faces down, arranged directly after said cooling chamber,

an eighth conveyer carrying said cooling chamber and connecting said turnover manipulators incorporated in the cleaning unit and temperature stabilizing unit,

a second discharge conveyer manipulator for removing said metal mould parts from said turnover manipulator incorporated in the temperature stabilizing unit,

an intermediate conveyer connecting said temperature stabilizing unit with said coating unit for transferring said metal mould parts from the temperature stabilizing unit to the coating unit,

a transfer device arranged intermediate said temperature stabilizing unit and said intermediate conveyer for transferring the metal mould parts from said second discharge conveyer incorporated in the temperature stabilizing unit to said intermediate conveyer,

a transfer device arranged between said intermediate conveyer and said coating unit, for transferring said metal mould parts from the intermediate conveyer to said feed conveyer incorporated in the coating unit,

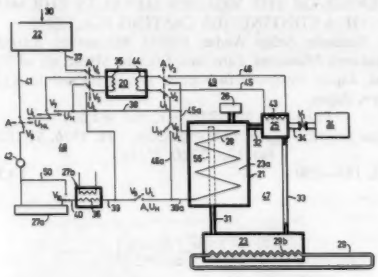
an additional conveyer means connecting a section of said device connecting said assembly manipulator with said transfer device with a section of said fifth conveyer incorporated in the casting solidification unit, for transferring said assembled moulds from one said section to another.

4,186,794

METHOD AND SYSTEM FOR STORING AND EXTRACTING LOW-TEMPERATURE HEAT ENERGY

Ernst-Åke Brunberg, 34, Frejavagen, Djursholm, Sweden (S-182 64), and Ray Olsson, 27, Boforsgatan, Farsta, Sweden (S-123 44)

Filed Dec. 28, 1977, Ser. No. 865,214
Claims priority, application Sweden, Dec. 29, 1976, 7614653
Int. Cl.[2] F25B *15/00, 17/02*
U.S. Cl. 165—2 **21 Claims**



1. Method of storing heat energy in a substance which is comprised in a chargeable and dischargeable energy accumulator and contains less liquid in the charged, high-energy condition of the accumulator than it does in the discharged, low-energy condition of the accumulator, comprising the steps of driving off vapor from the accumulator substance and transferring said vapor to vapor condensing and generating means while maintaining said vapor condensing and generating means at a low temperature as compared with the accumulator, and maintaining the system comprising said energy accumulator and said low temperature means substantially free from other gases than said vapor, so that the pressure in said system is constituted substantially by the pressure of said vapor.

8. System for the storage of heat energy into and the extraction of heat energy from at least one energy accumulator comprising a substance, which contains a bound liquid in the low-energy or discharged condition of the accumulator and which substantially lacks bound liquid in the high-energy or

charged condition of the accumulator; means for the charging of the accumulator by vaporation of liquid from the substance of the accumulator due to supply of heat from an energy source to the accumulator substance; a vapor generating and condensing means, which has a low temperature in relation to the energy accumulator and has a liquid container for collecting condensed vapor from the accumulator substance and means for the supply of vapor from the liquid container to the accumulator substance for discharging the accumulator; pressure reducing means for maintaining the partial pressure of other gases than said vapor at a lower level than the partial pressure of said vapor in the system comprising the energy accumulator and said low temperature means; and means for utilizing the energy freed at the discharge of the accumulator.

4,186,795

HEAT-EXCHANGER

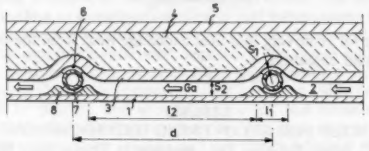
Ove B. Platell, Tilskogsvagen 15, S-190 30 Sigtuna, Sweden

Filed Dec. 2, 1977, Ser. No. 856,631

Claims priority, application Sweden, Dec. 6, 1976, 7613694

Int. Cl.² F24D *5/10*

U.S. Cl. 165—53 **10 Claims**



1. An arrangement for exchanging heat between a system of pipes adapted to conduct a flow of medium therethrough, and a plate-like heat exchange means, said arrangement being intended particularly for use in connection with air-temperature regulating means operating at a small temperature differential between the temperature of the plate-like heat exchange means and the medium,

said arrangement including mutually facing surfaces of two substantially parallel material layers, one of which surface comprises one side of the plate-like heat exchange means, defining an elongated plenum,

respective pipes of said system being arranged in said plenum to extend parallel with one another and at a distance from each other in a longitudinal direction of said plenum; and a stream of gas or air arranged to flow through the plenum, characterized in that gaps having a constant width are formed on opposite sides of the pipes by spacer means, which gaps extend along a considerable part of the outer surfaces of each pipe with the gaps having dimensions to cause the air or gas to move in a laminar flow through said gaps.

4,186,796

HEAT PIPE ELEMENT

Masayoshi Usui, Numazu, Japan, assignor to USUI International Industry, Ltd., Shizuoka, Japan

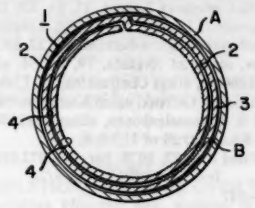
Filed May 8, 1978, Ser. No. 903,593

Claims priority, application Japan, May 17, 1977, 52-56030; Sep. 9, 1977, 52-120662[U]

Int. Cl.² F28D *15/00*

U.S. Cl. 165—105 **10 Claims**

1. In a heat pipe element having an outer pipe member and an inner wick or capillary member incorporated in the inner circumference of said outer pipe member, the improvement which comprises outer elongated pipe means and inner elongated tubular means adapted to be snugly inserted into the inner circumference of said outer pipe means in a closely overlapped manner with a continuous narrow space therewith, said inner tubular means being formed in a spiral shape in such a manner that there is provided a continuous narrow space between the adjacent surfaces of said inner tubular means, said



inner tubular means being provided with a multiplicity of fine recesses or corrugations extending longitudinally of said inner means in either of circumferential surfaces thereof.

4,186,797

DUAL-BELT COOLING SYSTEM

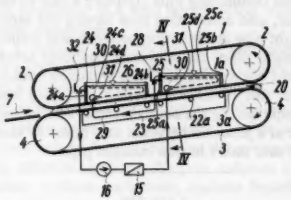
Manfred Guttinger, Stuttgart, and Konrad Schermutzki, Schmiden, both of Fed. Rep. of Germany, assignors to Sandco Limited, Ottawa, Canada

Continuation of Ser. No. 585,823, Jun. 11, 1975, abandoned. This application Apr. 21, 1977, Ser. No. 789,663

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1974, 2428292

Int. Cl.² F28F *25/06*

U.S. Cl. 165—120 **5 Claims**

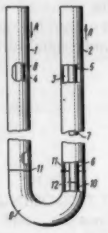


1. A dual-belt cooling system which includes two endless metal belts and four end rolls upon which the belts are mounted one above the other with coextensive runs of the belts forming a cooling zone therebetween through which a product passes in heat-exchange relationship with both of said belts, said belt runs extending at an angle with respect to the horizontal; means for supporting the lower of said coextensive belt runs; header means for providing stepped cooling of said product, said header means comprising a plurality of cooling frames arranged in series in the direction of belt travel, each of said cooling frames including an open top structure seated above the upper of said coextensive belt runs and being in fluid sealed relationship therewith, means for discharging a liquid coolant in each of said cooling frames such that said liquid in each frame is in substantially fluid sealed relationship with said upper of said coextensive belt runs to produce cooling and a controlled pressure within each of said cooling frames such that said liquid performs the dual function of cooling said product and exerting a pressure on said upper of said coextensive belt runs so as to urge said upper run against the product, the liquid level in the second cooling frame in the series being higher than the liquid level in the first of said cooling frames in cascade fashion, and a coolant flow connection between the two cooling frames so that liquid coolant discharged from one frame is introduced into the other.

4,186,798
TUBULAR COOLED MEMBERS OF METALLURGICAL FURNACE

Jury I. Tseluiko, prospekt Lenina, 17, kv. 55; Dorina B. Kutsykovich, prospekt Lenina, 39, kv. 54; Ljudmila A. Shabelnikova, Krasnoshkolnaya naberezhnaya, 22, kv. 101; Vladimir P. Kholopov, ulitsa 23 Avgusta, 79, kv. 54, all of Kharkov; Nikolai G. Schekin, ulitsa Cheljuskina, 75, Ljubotin Kharkovskoi oblasti; Lev D. Gritsuk, ulitsa Kombainovskaya, 13, kv. 3, and Leonid B. Katsenelenbogen, ulitsa Karla Marxa, 38, kv. 18, both of Kharkov, all of U.S.S.R.

Filed Jan. 27, 1978, Ser. No. 872,918
Int. Cl.[2] F28F *13/08, 9/26*
U.S. Cl. 165—147 **7 Claims**



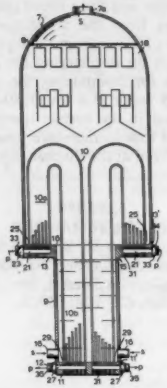
1. Tubular cooled members for a metallurgical furnace, comprising: a plurality of straight cooled pipes; a coolant flowing through an interior of each of said straight pipes; a plurality of inserts, a respective insert being coaxially arranged in the interior of a respective straight pipe, the cross-section of each of said inserts decreasing in the direction of flow of said coolant; a bent connecting pipe coupling a pair of said straight pipes together, said connecting pipe having the same diameter as each straight pipe at a junction between said connecting pipe and that straight pipe; and an insert coaxially arranged in an interior of said connecting pipe and arranged concordantly to a longitudinal axis of said connecting pipe, said insert in said connecting pipe having the same diameter as said insert in each straight pipe at a junction between said insert in said connecting pipe and said insert in that straight pipe.

4,186,799
SLAB HEADER

James H. D. Nickerson, and Robert R. Steel, both of St. Catharines, Canada, assignors to Foster Wheeler Limited, St. Catharines, Canada

Division of Ser. No. 603,849, Aug. 11, 1975, Pat. No. 4,117,885, which is a continuation of Ser. No. 510,327, Sep. 30, 1974, abandoned. This application Jun. 20, 1977, Ser. No. 807,845
Int. Cl.[2] F28F *9/22*
U.S. Cl. 165—176 **5 Claims**

1. A heat exchanger comprising:
a vessel;
a first tube sheet axially disposed within said vessel and having a first channel extending into said tube sheet from a periphery thereof;
a second tube sheet coaxial with said first tube sheet and having a channel extending into said tube sheet from a periphery thereof;
a plurality of tubes perpendicular to said channels, each of said tubes having a first leg connected to said first tube sheet for communication with said channel extending into said first tube sheet and a second leg connected to said second tube sheet for communication with said channel extending into said second tube sheet, said tube legs being received in said channels along the lengths of said channels;
a first peripheral chamber communicating with said channel extending into said first tube sheet;
a second peripheral chamber communicating with said channel extending into said second tube sheet;
means for introducing a heat exchange fluid into one of said chambers, and



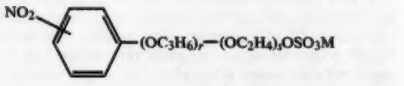
means for removing said heat exchange fluid from the other of said chambers.

4,186,800
PROCESS FOR RECOVERING HYDROCARBONS

Joseph C. Allen, Bellaire, Tex., assignor to Texaco Inc., White Plains, N.Y.

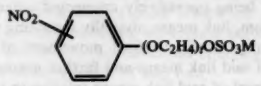
Filed Jan. 23, 1978, Ser. No. 871,898
Int. Cl.[2] E21B *43/22, 43/24*
U.S. Cl. 166—256 **6 Claims**

1. A process for recovering hydrocarbons from an underground formation penetrated by an injection well and a production well which comprises:
(a) establishing a burning zone in said formation at the face of said injection well,
(b) introducing a combustion-supporting gas into said formation via said injection well to propagate said zone toward said production well,
(c) terminating the injection of the combustion-supporting gas into the formation,
(d) displacing the unconsumed combustion-supporting gas in the formation behind the combustion zone by injecting into the formation via the injection well a gas selected from the group consisting of carbon dioxide, nitrogen or steam,
(e) injecting into the said formation via said injection well a mixture of carbon monoxide and hydrogen where reaction of steam generated from the formation water with the injected carbon monoxide forms additional hydrogen and carbon dioxide, and
(f) recovering the displaced hydrocarbons via the said production well, and wherein after step (e) there is injected into the formation via the said injection well a drive fluid comprising water containing dissolved therein from about 0.001 to 1.0 weight percent of an interfacial tension reducer selected from the group consisting of a compound of the formula:



wherein r is an integer of from 2 to about 5, s is an integer of from 8 to about 60 and M is selected from the group

consisting of hydrogen, sodium, potassium and the ammonium ion, and a compound of the formula:



wherein t is an integer of from 8 to about 40 and M has the same meaning as previously described.

4,186,801

IN SITU COMBUSTION PROCESS FOR THE RECOVERY OF LIQUID CARBONACEOUS FUELS FROM SUBTERRANEAN FORMATIONS

Ajay M. Madgavkar, Pittsburgh; Roger F. Vogel, Butler, and Harold E. Swift, Gibsonia, all of Pa., assignors to Gulf Research and Development Company, Pittsburgh, Pa.

Filed Dec. 18, 1978, Ser. No. 970,561
Int. Cl.² E21B *43/24*
U.S. Cl. 166—256 **17 Claims**

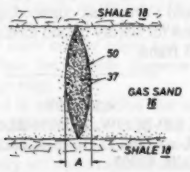
1. The in situ combustion process for recovering liquid hydrocarbons from subterranean formations which comprises injecting a stream of combustion air into at least one injection well leading to a combustion zone in said subterranean formation, producing liquid hydrocarbons and combustion gas from at least one production well, separating the liquid hydrocarbons from the stream of combustion gas whereby a separated stream of flue gas is obtained having a heating value between about 15 Btu/scf. and about 200 Btu/scf. and containing at least one aliphatic hydrocarbon having from one to about seven carbon atoms, passing said gas stream admixed with air for combustion in contact with at least one supported platinum oxidation catalyst having incorporated therewith at least one metal oxide cocatalyst selected from Groups IA, II, III, VIIB and VIII up through atomic No. 45, the lanthanides, chromium, silver, tin and antimony in at least one combustion zone at a temperature high enough to initiate and maintain combustion of said gas stream, the total amount of combustion air being sufficient to provide an air equivalence ratio between about 0.20 and about 0.90, expanding the gas stream in a gas turbine following said catalyzed combustion; and driving an air compressor with said gas turbine to compress and inject said stream of combustion air into the said subterranean combustion zone.

4,186,802

FRACING PROCESS

William Perlman, 2302 Niels Esperson Bldg., Houston, Tex. 77002

Filed Mar. 13, 1978, Ser. No. 885,944
Int. Cl.² E21B *43/26*
U.S. Cl. 166—280 **23 Claims**



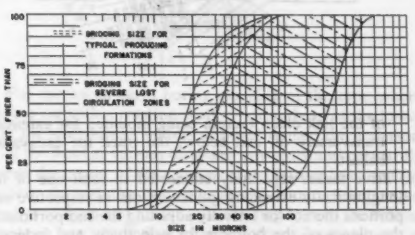
1. A method of forming vertical linear fractures in a subterranean producing formation extending outwardly from a well penetrating the formation without forming any substantial radial vertical fracturing of overlying or underlying strata, comprising the steps of introducing, in a multiplicity of stages a proppant laden fracing fluid carrying a fine-sized proppant material in an average proppant-to-fluid ratio of at least eight pounds per gallon, introducing between said stages of proppant laden fracing fluid a spacer stage of fracing fluid without proppant, said proppant laden fracing fluid and said spacer fracing fluid being injected at an injection rate below 25 barrels per minute and at a pressure selected for producing said vertical linear fracture in the formation, said introduction of said proppant laden fracing fluid continuing until at least 25,000 pounds of said fine proppant material have been deposited in the formation fracture for each one-foot of available net producing formation.

4,186,803

WELL COMPLETION AND WORK OVER METHOD

Thomas C. Mondshine, Houston, Tex., assignor to Texas Brine Corporation, Houston, Tex.

Division of Ser. No. 850,639, Nov. 11, 1977, which is a continuation-in-part of Ser. No. 735,169, Oct. 26, 1976, abandoned. This application Aug. 30, 1978, Ser. No. 938,033
Int. Cl.² E21B *33/138*
U.S. Cl. 166—292 **2 Claims**



1. In a well completion and workover method wherein a subterranean formation in a well is contacted with a treating fluid, the steps comprising:

a. pumping a treating fluid in the well and contacting the formation with said treating fluid wherein said treating fluid comprises a saturated aqueous saline solution with at least one water soluble salt which is substantially insoluble in the saturated saline solution, said aqueous saline solution and water soluble salt each selected from the group consisting of potassium chloride, sodium chloride, calcium chloride, sodium sulfate, sodium carbonate, sodium bicarbonate, calcium bromide and potassium carbonate and mixtures thereof;

b. forming a bridge and seal on the formation to bridge and seal off the formation by maintaining said water soluble salt which is substantially insoluble in the saturated saline solution in a particle size range of about 5 microns to about 800 microns with greater than about 5% of the particles being coarser than 44 microns; and

c. dissolving the water soluble salt bridging particles off the formation to remove the bridge and seal from the formation for flow of hydrocarbons therefrom into the well.

4,186,804

BALLAST EXCAVATING CHAIN ARRANGEMENT

Josef Theurer, Vienna, and Karl Fulser, Linz-Urfahr, both of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H, Vienna, Austria

Filed Mar. 2, 1978, Ser. No. 882,665
Claims priority, application Austria, Mar. 22, 1977, 1998/77
Int. Cl.² F01B *27/00*
U.S. Cl. 171—16 **8 Claims**

1. In a track working machine comprising a frame mounted for mobility on the track having ties resting on ballast: a ballast excavation chain arrangement including

(a) a polygonal chain guide mounted on the frame and having two longitudinally extending guide sections and a

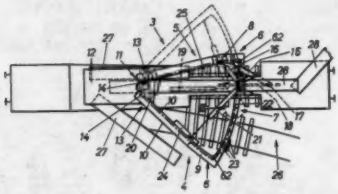
transversely extending guide section, the chain guide sections being trough-shaped and having a bottom,

(1) the longitudinally extending guide sections having respective lower portions connected to respective ends of the transversely extending guide section, and

(2) the longitudinally extending guide sections being so mounted that respective center portions thereof have a minimum distance corresponding to at least a length of a track tie in a direction transverse to the track and being mounted for lateral adjustment of the lower portion thereof independently of each other by a distance corresponding to at least a length of a track tie,

(b) an endless ballast excavation link chain supported in the chain guide,

(1) the transversely extending guide section and a portion



of the link chain therein being mounted for extension transversely of, and below, the track for excavating ballast,

(c) drive means separately connected to each one of the longitudinally extending guide sections in respective end portions thereof for laterally adjusting the end portions in the planes of the bottoms for selectively and independently extending a respective one of the chain guides to the right and to the left of the track for at least the length of a track tie,

(d) guide section members detachably connecting the transversely extending guide section and the lower portions of the longitudinally extending guide sections, and

(e) ballast conveyor means adjustable for redistributing cleaned excavated ballast in the ballast bed selectively to the right and to the left of the track.

4,186,805

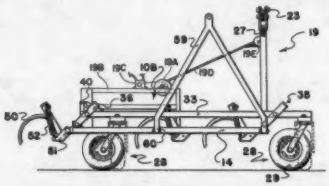
GROUND WORKING IMPLEMENT

Pete Repski, Box 30, Craik, Saskatchewan, Canada

Filed May 30, 1978, Ser. No. 910,218

Int. Cl.[2] A01B *19/04*

U.S. Cl. 172—248 **14 Claims**



1. A ground working implement comprising in combination a center section and at least two further sections articulately connected one upon each side of said center section for relative movement one with the other in at least a vertical plane, a hitch pole assembly operatively connected to said implement, each section including a generally rectangular frame, a plurality of ground working tools operatively mounted on said frame, means to raise and lower said tools relative to said frame, and at least one pair of castor wheel assemblies mounted on said frame for supporting said frame, means mounting said castor wheel assemblies to said frame, said means including a fore and aft beam pivotally mounted to the front and rear of said frame, said castor wheel assemblies being operatively connected one adjacent the front end of said fore and aft beam and the other being operatively connected adjacent the rear end of said beam, link means pivotally mounting said beam to said frame for generally vertical movement of said frame, means to pivot said link means and further means to limit the pivotal movement of said link means relative to said frame.

4,186,806

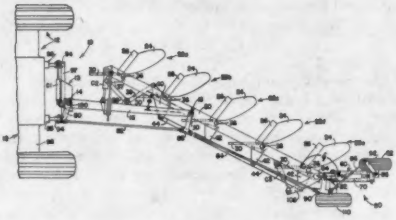
PLOW SYSTEM

Gerald G. Ward, Naperville, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Sep. 6, 1977, Ser. No. 830,713

Int. Cl.[2] A01B *69/00, 59/044*

U.S. Cl. 172—283 **7 Claims**



1. In a tractor-motivated plow system, in combination, a hitch assembly for attachment to the rear end of a tractor and including a hitch block having a generally vertical hitch pivot, said block being mounted for generally transverse to and fro movement of said block and said pivot relative to the line of travel of the tractor, a first hydraulic ram for moving said block and pivot, a pull frame having its forward end connected to said hitch pivot for limited horizontal swinging movement of the pull frame throughout a small angle, a main frame having a medial region pivoted to the rear end of the pull frame and inclined relative to the latter, a second hydraulic ram effective between the forward end of the main frame and the pull frame for regulating the inclination between the main frame and the pull frame, said first and second hydraulic rams being connected in series for unison but proportional movement about said medial connection, a plurality of plow units mounted on said main frame in longitudinally spaced relationship and on opposite sides of said medial region, said plow units being rotatable about respective vertical axes, and means responsive to the inclination between the main frame and the pull frame for effecting commensurate rotation of said plow units in unison so that their cut lines remain parallel, said latter means embodying a crank arm on each plow unit, draw links connecting the crank arms of adjacent plow units together for movement in unison, and a draw link connecting the crank arm of at least one plow unit forwardly of said medial region of the main frame to the pull frame.

4,186,807

OPTIONAL UP-BLOW, DOWN-BLOW JAR TOOL

Wayne N. Sutliff, and Jim L. Downen, both of 2931 Pierce Rd., Bakersfield, Calif. 93308

Filed Dec. 20, 1977, Ser. No. 862,487

Int. Cl.[2] E21B *1/10*

U.S. Cl. 175—302 **6 Claims**

1. In a mechanical jar tool, the combination of:

inner and outer telescopically related tubular elements;

means for connecting one of said elements to a drill string;

means for connecting the other element to an object to be jarred referred to herein as a "fish", telescopically over-

lapping portions of said elements providing an annular chamber;

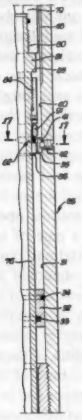
a pair of impact shoulders being provided on said respective elements to form impact faces which are brought into collision to limit telescopic movement between said elements in one of the two directions effecting respectively extension or contraction of said tool;

a male threaded area formed externally on said inner element within said chamber;

a tapered external conical face formed on said inner element starting at one end of said threaded area and decreasing in radius as said conical face extends axially away from said threaded area;

a thin walled adjusting nut screwed onto said threaded area and freely adjustable lengthwise thereon, said nut having locking means for fixing said nut in a selected position on said inner element;

a jar wedge ring internally tapered to conform to and loosely fit said tapered face of said inner element and having at least one radial split formed in said jar wedge ring, the periphery of said jar wedge ring being approximately cylindrical with outer corner edges bevelled;



means for spring biasing said jar wedge ring axially towards and into conctact with said adjusting nut and halting axial shifting of said jar wedge ring more than a short distance away from said adjusting nut; and

a jar trip ring mounted fixedly on the inner face of said outer element, the inner face of said jar trip ring being cylindrical with bevelled inner corner edges and slightly less in inside diameter than the outside diameter of said split bevelled jar wedge ring;

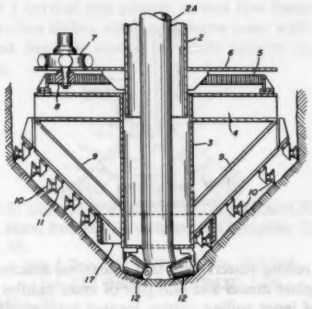
said nut being locked in such a position that when said telescopic movement shifts said jar wedge ring axially against said trip ring and constricts the inside face of the wedge ring into conformity with said tapered element face while forcing said wedge ring also against said adjusting nut, the periphery of the wedge ring will be just enough larger than the inside diameter of the jar trip ring to require application of a predetermined desireable heavy pressure through said bevelled wedge ring to said bevelled trip ring to force the bevelled wedge ring through the trip ring and accomplish a jar blow being struck by bringing said impact faces into a violent collision.

4,186,808

EARTH BORING MACHINE WITH CRUSHING ROLLERS

Kenneth C. Cox, Blackburn Rd., R.D. #4, Sewickley, Pa. 15143

Filed Jun. 29, 1977, Ser. No. 811,033
Int. Cl.[2] E21B *9/22*
U.S. Cl. 175—334 **7 Claims**



1. For use on an earth boring machine of the type where there is a rig with a rotating shaft, a boring head at the lower end of the shaft having cutters disposed around the undersurface of the head at various distances upwardly and outwardly between the center of the rotation of the boring head and the periphery thereof, the boring head and cutters being so arranged as to form and provide a collecting area in the bottom of the bore into which rock chips and fragments produced in the operation of the machine collect with the bottom of the bore around the collecting area sloping upwardly and outwardly from the collecting area toward the periphery of the bore at an angle to favor the descent of the fragments by gravity toward a barrier and collecting area and wherein elevator means is provided for removing the rock chips and fragments so produced and received in the collecting area, the invention comprising a boring head having:

(a) means arranged on the undersurface of the head comprising an annular barrier attached to the undersurface of the head effectively interposed between cutters in the collecting area and those cutters on the head outside the barrier for intercepting rock fragments moving down the sloping area around the barrier which are too large for removal thereof from said area by said elevator means while at the same time providing clearance for other cuttings and fragments to enter said area; and

(b) crushing roller means with the peripheral surface thereof spaced above the surface of the bottom of the bore on the undersurface of the boring head arranged to crush said rock fragments which are so intercepted to a size where they can clear said barrier.

4,186,809

STEEP ANGLE RAISE BIT

Howard E. Mitchell, Duncanville, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Nov. 6, 1978, Ser. No. 958,299
Int. Cl.[2] E21B *9/24;* E21C *23/00*
U.S. Cl. 175—334 **2 Claims**

1. An earth boring bit for boring a large diameter hole by disintegrating the earth formations surrounding a pilot hole, comprising:

main plate means;

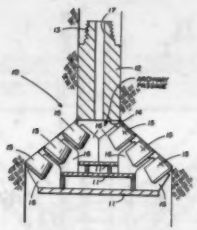
a pair of inner saddles mounted on said main plate means, said inner saddles positioned adjacent each other;

a pair of inner rolling cutters mounted in said pair of inner saddles;

a multiplicity of additional saddles mounted on said main plate means;

a multiplicity of additional rolling cutters mounted in said additional saddles; and

a stem member for projecting into said pilot hole, said stem member having an archway passage and extensions extending from said archway passage that bridge said pair of



inner rolling cutters with said extensions attached to said main plate means and said pair of inner saddles and said pair of inner rolling cutters located substantially within said archway passage with said pair of inner rolling cutters and said additional rolling cutters positioned to provide a continuous angle earth formation profile having a conical shape with an included angle within the range of 134° to 60°.

4,186,810

FLUID OPERATED UNDERCUTTER

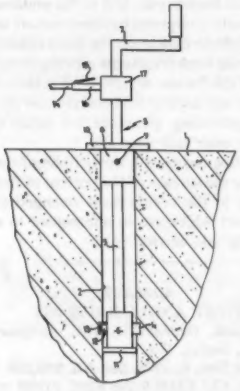
David T. Allan, 9 Broomhill Dr., Rutherglen, Glasgow, Scotland (G73 3 QH), assignor to John MacDonald & Company (Pneumatic Tools) Limited and David Thomson Allan, both of Glascow, Scotland

Filed Jul. 5, 1977, Ser. No. 812,620

Claims priority, application United Kingdom, Jul. 6, 1976, 28015/76

Int. Cl.² E21B *1/06*

U.S. Cl. 175—96 **17 Claims**



1. An undercutter for undercutting the wall of a substantially parallel sided hole and comprising a substantially tubular body having a lesser diameter than the diameter of said hole for positioning into said hole, means mounted on the body for setting the length of said body contained in the hole, and a fluid operated reciprocating cutting head pivotally mounted on the body to be rotated within the hole so as to form an undercut portion therein.

4,186,811

TRACTOR VEHICLE IN PARTICULAR FOR AGRICULTURAL USE

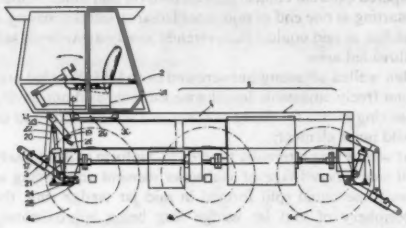
Jacques Bidon, 51230 Velye, Vertus, France

Continuation of Ser. No. 765,779, Feb. 4, 1977, abandoned. This application Mar. 15, 1978, Ser. No. 886,817

Claims priority, application France, Feb. 10, 1976, 76 03589

Int. Cl.² B62D *11/04*

U.S. Cl. 180—6.48 **7 Claims**



1. A tractor vehicle, in particular for agricultural use, comprising a chassis having a longitudinal axis, at least a front set of driving wheels and a rear set of driving wheels supporting the chassis with at least one wheel of each set being positioned on each lateral side of said longitudinal axis, a cab, means mounting the cab on the chassis and allowing the cab to travel from one end of the vehicle to an opposite end of the vehicle in a direction parallel to said longitudinal axis, an engine and power take-off means carried by the chassis, the power take-off means being for connection to tool means, first means for controlling the driving and steering of the vehicle and second means for controlling the tool means connected to the take-off means, the first and second means being located inside the cab, two independent drive means, one of the drive means being drivingly connected to a pair of said wheels located on one lateral side of said longitudinal axis and the other of the drive means being drivingly connected to a pair of said wheels located on an opposite lateral side of said longitudinal axis, transmission means drivingly connecting the engine to the two drive means, variator-inverter means included in the two drive means, whereby the engine is capable of driving selectively either of the drive means, both of the drive means at the same time in a symmetrical manner and in an unsymmetrical manner, means included in the two drive means for reversing the drive means so that the vehicle can be made to travel in two opposite directions, substantially identical raising devices respectively mounted on the chassis at longitudinally opposed ends of the vehicle for carrying said tool means, a driving station located in the cab and mounted to pivot through at least 180° about a vertical axis relative to the chassis whereby, irrespective of the direction of travel of the vehicle, the operator of the vehicle can face and be close to the stretch of ground to be treated.

4,186,812

EQUALIZER BAR SUPPORT ASSEMBLY

Robert A. Sutton, Davenport, Iowa, assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 7, 1977, Ser. No. 813,725

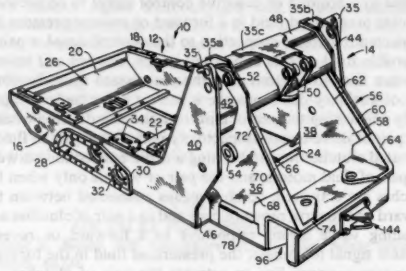
Int. Cl.² B62D *55/14*

U.S. Cl. 180—9.5 **15 Claims**

1. A support assembly for an equalizer bar for a loader having a main frame, comprising:

(a) a plurality of plates being connected in a box section, one

of said plates being of a construction to extend from said box section to define a space between said one plate and



said box section and to connect said box section to the main frame; and

(b) means for holding the equalizer bar in said space.

4,186,813

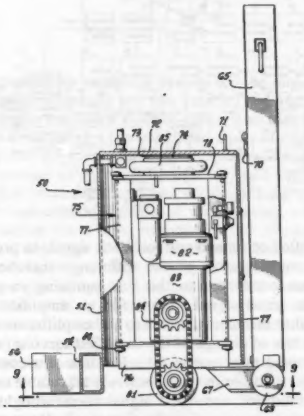
STEERABLE DRIVE UNIT FOR TRANSPORTER

Robert E. Burdick, Santa Barbara County, Calif., assignor to Rolair Systems, Inc., Santa Barbara, Calif.

Filed Apr. 3, 1978, Ser. No. 893,079

Int. Cl.[2] B60V *1/00*; B60K *7/00*

U.S. Cl. 180—13 **3 Claims**



1. In a drive unit for moving a transporter or other load carrier over a floor or the like, the combination of:

a first frame including a circular sleeve;

coupling means for removably coupling said first frame to the carrier;

a second frame;

said first and second frames having interengaging means for vertical sliding and horizontal pivoting of said second frame with respect to said first frame;

said interengaging means consisting of vertically spaced sets of rollers mounted on said second frame for rotation about vertical axes in engagement with the inner wall of said sleeve;

a drive wheel mounted in said second frame;

drive means for rotating said drive wheel;

lift means for moving said second frame vertically relative to said first frame for engaging said drive wheel with the floor for propelling the carrier;

a steering arm connected to said second frame for pivoting said second frame relative to said first frame for steering the carrier;

with said steering arm connected to said second frame at a pivot axis for pivoting in a vertical plane; and

a pair of auxiliary wheels mounted on said second frame for rotation on said pivot axis and for tipping of said drive unit about the axis of said auxiliary wheels;

with said rollers rotating when said second frame is rotated about a vertical axis relative to said first frame and with said rollers sliding along said sleeve inner wall when said second frame is moved vertically relative to said first frame.

4,186,814

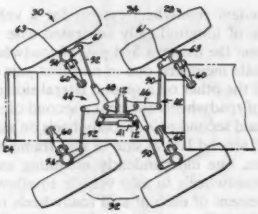
MOTOR GRADER ROADWHEEL ARRANGEMENT

Cullen P. Hart, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 23, 1977, Ser. No. 863,967

Int. Cl.[2] B60G *19/06*; B62D *7/06*

U.S. Cl. 180—24 **15 Claims**



1. A construction vehicle, comprising:

a frame;

a first pair of steerable roadwheels mounted on opposite lateral sides of and adjacent a first end of said frame;

a tandem roadwheel arrangement mounted adjacent a second end of said frame and comprising a second pair of steerable roadwheels, one mounted on a first and the other on a second lateral side of said frame and a third pair of steerable roadwheels, one mounted on the first and the other on the second lateral side of said frame intermediate the mounting of said second pair of roadwheels and said second end of said frame, the two roadwheels of said second and third pairs of roadwheels on said first side of said frame comprising a first tandem roadwheel set and the two roadwheels of said second and third pairs of roadwheels on said second side of said frame comprising a second tandem roadwheel set;

means for linking said second and third pairs of roadwheels for simultaneous coordinated angling thereof relative to said frame to accomplish steering thereof;

means for transmitting power to said tandem roadwheel arrangement;

four hydraulic strut cylinders, one for each of the roadwheels of said second and third pairs of roadwheels, each strut cylinder acting generally vertically between said frame and a respective roadwheel, each of said strut cylinders being rigidly connected at a cylinder end thereof to said frame and being rigidly connected at a rod end thereof to a respective one of said roadwheels; and

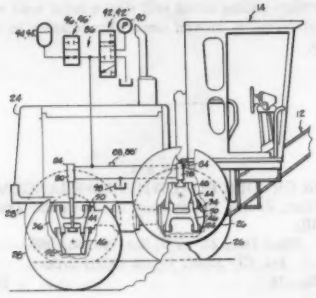
means for causing said roadwheel angling means to act simultaneously to rotate the rods of said strut cylinders, thus utilizing said strut cylinders as pivotal kingpins with the rods thereof rotating within the cylinders thereof.

4,186,815

SUSPENSION AND DRIVE FOR TANDEM WHEEL VEHICLE

Cullen P. Hart, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 27, 1977, Ser. No. 864,996
Int. Cl.[2] B60G *17/00*; B62D *61/10*
U.S. Cl. 180—41 **5 Claims**



1. In a tandem roadwheel system for a vehicle having a frame; a pair of longitudinally separated axle members supported adjacent the frame; a first pair of roadwheels adjacent a first of said axle members, one of said first pair of roadwheels on a first and the other on a second lateral side of the frame; a second pair of roadwheels adjacent a second of said axle members, one of said second pair of roadwheels on said first and the other on said second lateral side of said frame; four parallelogram linkages, one independently mounting each respective one of said roadwheels to said vehicle to allow independent vertical movement of each of said roadwheels relative to said frame; four generally vertically acting hydraulic motors, each of said motors being disposed between said frame and a respective one of said roadwheels for adjusting the relative vertical positioning therebetween; the improvement comprising:

four drive shafts, one between each roadwheel and the adjacent axle member;

means for universally mounting a first end of each drive shaft to be driven by the adjacent of said axle members;

means for universally mounting a second end of each drive shaft to drive a respective one of said roadwheels;

a source of pressurized fluid carried by said vehicle;

first conduit means for interconnecting the head ends of the two hydraulic motors acting on the roadwheels on the first lateral side of the frame;

means for selectively coupling said pressurized fluid source with said first conduit means;

second conduit means for interconnecting the head ends of the two hydraulic motors acting on the roadwheels on the second lateral side of the frame; and

means for selectively coupling said pressurized fluid source with said second conduit means.

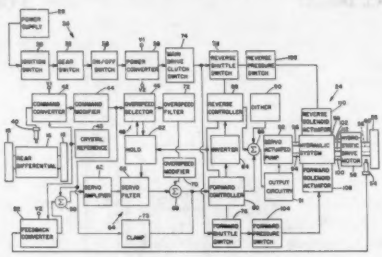
4,186,816

SUPPLEMENTARY HYDROSTATIC DRIVE ELECTRONIC CONTROL

Donald K. Pfundstein, Peosta, Iowa, assignor to Deere & Company, Moline, Ill.

Filed May 30, 1978, Ser. No. 910,572
Int. Cl.[2] B60K *17/34*
U.S. Cl. 180—243 **21 Claims**

15. In a vehicle having an engine, an engine driven transmission shiftable between forward and reverse in response respectively to forward and reverse pressure signals, a shuttle controller having a lever positionable between forward and reverse positions to respectively effect the forward and reverse pressure signals, a differential connected to the transmission and driven thereby, a pair of main drive wheels connected to the differential for propelling the vehicle, an engine-driven, reversible, variable displacement fluid pump operable in response to a positive or negative control signal to respectively provide pressurized fluid in a forward or reverse pressure line connected thereto in proportion to the control signal, a pair of reversible fluid motors connected to the forward and reverse pressure lines to be driven by the pressurized fluid therein, a pair of auxiliary drive wheels; a pair of drive means respectively connecting the pair of motors to the pair of drive wheels; said pair of drive means respectively including a pair of fluidly activated clutches for establishing a drive connection between the pair of fluid motors, and the pair of wheels only when the clutches are activated, conduit means connected between the forward and reverse pressure lines and to a pair of clutches and including valve means responsive to a forward or reverse actuator signal to connect the pressurized fluid in the forward or reverse pressure line to activate the pair of clutches, an electronic control comprising: main drive sensor means operatively associated with the connection between the transmission and the differential for sensing the speed thereat and providing a command signal representative thereof; command modifier means connected to the main drive sensor means for modifying the command signal by a first predetermined percentage thereof and providing a modified command signal representative operatively associated with one of the pair of fluid motors and providing a feedback signal representative of the speed thereat; first summing means connected to the command modifier means and the supplementary drive sensor means for summing the modified command and feedback signals to provide a servo signal representative of the difference therebetween; amplifier means connected to the first summing means for amplifying the servo signal to provide an amplified servo signal; servo filter means connected to the amplifier means for regulating the rate of change of the amplified servo signal to a first predetermined rate; overspeed selector means connected to the command modifier means selectively actuatable to block or allow the modified command signal therethrough; overspeed filter means connected to the overspeed selector means for regulating the rate of change of the modified command signal to a second predetermined rate; overspeed modifier means connected to the overspeed filter means for modifying the modified command signal therefrom by a second predetermined percentage thereof and providing an overspeed signal representative thereof; second summing means connected to the servo filter and the overspeed modifier means for summing the servo and overspeed signals and providing a servo control signal representative of the sum thereof; forward controller means connected to the second summing means and the shuttle controller responsive to the forward and reverse pressure signals and positions of the lever to provide the servo control signal respectively to first and second outputs provided therein, said forward controller means including means connected to the clutch valve responsive to the forward pressure signal and position of the lever to provide the forward actuator signal to the clutch valve; inverter means connected to the first output of the forward controller means for inverting the servo control signal to provide an inverted servo control signal;



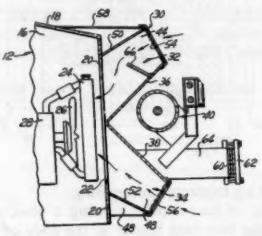
reverse controller means connected to the inverter means and the shuttle controller means responsive to the reverse pressure signal and position of the lever to block or allow the inverted servo control signal therethrough, said reverse controller means including means connected to the clutch valve responsive to the reverse pressure signal and position of the lever to provide the reverse actuator signal to the clutch valve; and third summing means connected to the fluid pump and the output of the forward controller means and the reverse controller means for summing the servo control and inverted servo control signals to provide the positive or negative control signal representative of the sum thereof to the fluid pump.

4,186,817

AIR INLET FOR ARMORED CAR

Russell E. Bauer, 920 Lakeshore Dr., Grosse Pointe Shores, Mich. 48236

Filed Oct. 14, 1977, Ser. No. 842,224
Int. Cl.[2] B60K *1/00*; F41H *5/00*; B60H *3/00*; F01P *7/00*
U.S. Cl. 180—54 A **9 Claims**



1. A cooling air induction system for the engine compartment of an armored car and like vehicle, said engine compartment being an enclosure made of armor steel plates and having at least a front panel, a top panel, and a pair of side panels, said air induction system comprising an opening in said front panel for the passage of air therethrough into said engine compartment, a pair of air ducts disposed with their longitudinal axes at an angle and converging toward said opening, a first exterior wall of said air ducts being formed by a pair of panels of armor steel plate arranged at an angle to each other and forming a shield overlapping at least a pair of opposite edges of said opening, a pair of opposite second and third exterior walls for each air duct, said opposite exterior walls being made of armor steel plate and extending each from proximate one of the other edges of said opening, and a fourth exterior wall for each air duct opposite to said first wall and extending from the inlet of said duct to the front armor steel plate panel proximate said opening, each of said fourth exterior walls being made of ordinary non-bullet-proof material.

4,186,818

AUXILIARY POWER STEERING FOR MOTOR VEHICLES

Erich Jablonsky, Boebingen, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Fed. Rep. of Germany

Filed Jul. 11, 1978, Ser. No. 923,682
Int. Cl.[2] B62D *5/08*
U.S. Cl. 180—133 **8 Claims**

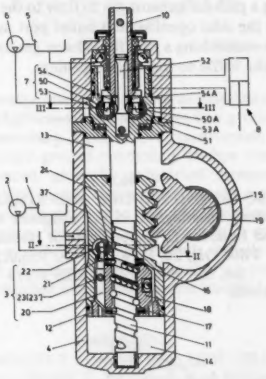
1. In a dual system for power steering of a vehicle wherein said system has a pair of hydraulic circuits, each circuit comprising a pump, a double acting power cylinder and a valve mechanism; the improvement which comprises:

a first hydraulic steering circuit wherein the double acting cylinder (4) has a piston therein with the valve mechanism of said circuit carried thereby and comprising a moveable valve means (22) and resilient means (23, 23') for effecting return to a neutral position of said valve means from a steering position and an actuator means (51, etc.) for actuating said valve means;

a second hydraulic steering circuit having the valve mechanism thereof comprising moveable valve means (50, 50A) and resilient means (52) for return bias thereof to a neutral position from a steering position;

a manually operable actuator means (10) connected to operate the second steering circuit valve means (50, 50A), and connected to the actuator means (51) of said first hydraulic steering circuit by the resilient means (52) of said second hydraulic steering circuit for operation of said latter actuator means (51);

wherein said latter resilient means (52) is of a lesser resiliency than that of the first hydraulic steering circuit so that initially upon operation of said manually operable actuator means (10) the actuator means (51) of the first hydraulic circuit is operated by connection with said latter resilient means (52) whereby to effect operation to a predetermined position of the valve means (22) of the first hydraulic steering circuit and means (21) whereby continued operation of the manually operable actuator means (10) effects yielding of the latter resilient means (52) to effect a subsequent operation of the valve means (50, 50A) of the second hydraulic steering circuit.



7. An arrangement for actuating a pair of valve means (22; 50, 50A) in sequential order wherein each valve means has a respective valve actuator (10, 51) which are relatively rotative;

each valve means having a respective resilient return bias means (23, 23'; 52);

the return bias means (52) of one valve means (50,50A) dominating the return bias means (23, 23') of the other valve means (22) and the actuators being connected to each other by said dominant return bias means (52) so as to effect actuation of the other valve means (22) against its yielding return bias means (23, 23') by rotation of one actuator (10), acting through said dominant return bias means (52), to a predetermined position of said other valve means and means effective at that time whereby said dominant return bias means (52) then yields to permit rotation of the other actuator (51) upon continued rotation of said one actuator (10).

4,186,819

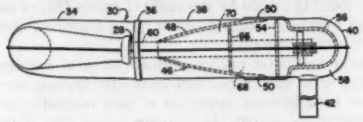
EXHAUST SYSTEM FOR A TWO-STROKE ENGINE

Klaus F. Nowak, Uxbridge, Canada, and Stephen A. Braun, Horicon, Wis., assignors to Deere & Company, Moline, Ill.

Filed Sep. 28, 1978, Ser. No. 946,546
Int. Cl.[2] F01N *1/08*
U.S. Cl. 181—265 **11 Claims**

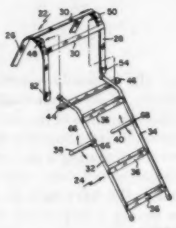
1. A two-cycle engine exhaust muffler, comprising: an elon-

gate tubular shell having inlet and outlet openings spaced from each other along the length of the shell; said shell including a first portion which increases in cross-section from a first to a second end thereof with the first end being located adjacent the inlet opening; said shell further including a second portion of substantially constant cross-section having a first end joined to the second end of the first portion; a generally conical baffle defining a hollow enclosure and being located in the shell



between the inlet and outlet openings; said baffle having a large end fixed in exhaust gas sealing relationship to the second portion and having a small end located adjacent the second end of the first portion; inlet port means provided in the baffle for establishing a path for exhaust gas to flow to the interior of the baffle from the inlet opening; and outlet port means provided in the baffle establishing a path for exhaust gas to flow from the interior of the baffle to the outlet opening.

4,186,820
BOARDING LADDER AND STRAPS
Dieter Cosman, Huntington, N.Y., assignors to Henry W. Ruppel and Kathleen C. Ruppel, both of Huntington, N.Y.
Filed Oct. 26, 1978, Ser. No. 955,012
Int. Cl.[2] E06C 7/48; B63B 27/14
U.S. Cl. 182—93 **7 Claims**



1. A boarding ladder for use in conjunction with an inflatable boat having a rigid floorboard and an inflated side pontoon comprising:

a ladder portion including a pair of substantially vertical side rails and a plurality of substantially horizontal rungs mounted to said rails;

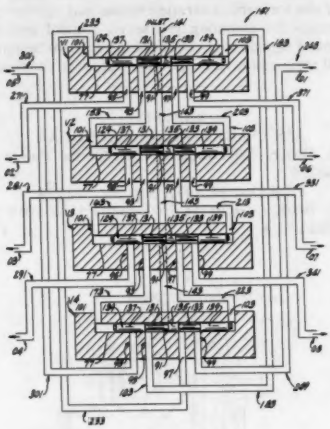
a horizontal projection extending from each side rail;

a pair of struts extending from said ladder portion substantially perpendicular to a plane defined by said side rails;

a harness means fastening said harness to said boat whereby said harness is wrapped outwardly around said pontoon and extends downwardly therefrom;

said harness includes first means for removably engaging said horizontal projections of said side rails with said harness and second means for engaging ends of said pair of struts remote from ends communicating with said side rails in said harness whereby when engaged in said harness said ladder portion will project downward and upward from an inflated side pontoon of an inflatable boat and will be prevented from rotating about said pontoon under said boat.

4,186,821
LUBRICATING APPARATUS
Jerome B. Wegmann, St. Louis County, Mo., assignor to McNeill Corporation, Akron, Ohio
Filed May 15, 1978, Ser. No. 905,633
Int. Cl.[2] F01M 1/06
U.S. Cl. 184—7D **12 Claims**



1. Lubricating apparatus comprising:

an assembly of base blocks forming a base, said assembly comprising two base blocks at the ends of the assembly constituting first and second end blocks and at least one base block between the end blocks constituting an intermediate block each of said base blocks having a bottom, top, sides and ends, said base blocks being assembled with one side of the first end block, constituting its inside face, in face-to-face relation with one side of the adjacent intermediate block and with one side of the second end block, constituting its inside face, in face-to-face relation with one side of the adjacent intermediate block, each of said base blocks having a lubricant outlet at each of its ends;

a series of divider valves, one for each of the base blocks, each comprising a valve block having a bottom, top, sides and ends, a bore extending endwise in the block, a set of passages extending up from the bottom to the bore and in communication with the bore at spaced points along the length of the bore, said set comprising an inlet passage for delivery of lubricant to the bore, transfer passages for interconnection of the valves in the series, and outlet passages for delivery of lubricant from the bore, and a piston member axially slidable in the bore by pressure of lubricant in the bore, the piston members of the valves being successively movable to deliver charges of lubricant through the outlet passages in a sequence via the delivery of lubricant under pressure through the inlet passages to the bores and interconnections between the valves established by the piston members and said transfer passages;

said series of divider valves comprising a first and second end valve and at least one intermediate valve each mounted on a respective base block with its bottom in face-to-face relation with the top of the respective base block;

said assembly of base blocks having passaging for delivery of lubricant to the valve inlet passages comprising an inlet manifold formed by a hole in the first end block extending laterally to its inside face, a registering lateral hole in the intermediate block extending through the intermediate block from one side to the other, and a registering hole extending into the second end block laterally from its inside face, said delivery passaging further comprising:

holes extending down from the top of the base blocks to the

said lateral holes, said downwardly extending holes being in register at their upper ends with the lower ends of the inlet passages in the valve blocks;

said assembly of base blocks further having passaging for interconnection of the said transfer passages of the valves comprising holes in the end blocks extending laterally to their inside faces, registering holes in the intermediate block extending laterally inward from the sides thereof, and holes extending down from the top of the base blocks to the said lateral holes, said downwardly extending holes having their upper ends in register with the lower ends of the transfer passages in the valve blocks;

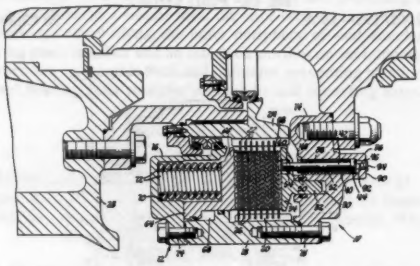
and said assembly of base blocks further having passaging for delivery for lubricant from said outlet passages in the valve blocks to the outlets at the ends of the base blocks comprising holes in the end blocks open at their inside faces, registering holes in the intermediate block open at the sides thereof, and holes extending down from the top of the base blocks having their upper ends in register with the lower ends of the outlet passages in the valve blocks.

4,186,822

DISC BRAKE PACK WEAR INDICATOR

Natabara Khuntia, Hudson, and Charles W. Rader, Willowick, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 28, 1978, Ser. No. 919,766
Int. Cl.[2] F16D *66/02*
U.S. Cl. 188—1 A **1 Claim**



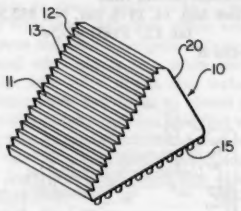
1. In a disc brake having a housing, a pressure chamber formed in said housing, a bore for a piston retracting mechanism formed in said housing, a piston sealingly and reciprocably mounted in said pressure chamber for brake actuation by pressure introduced into said chamber, said piston having a stepped hole in axial alignment with said bore and having a shoulder therein, and a piston retracting mechanism in said bore and hole, said piston retracting mechanism including a return spring guide pin having a head on one end in one end of said bore, a compression piston return spring having one end engaging said guide pin head and the other end engaging a bore cover secured to said housing, said guide pin extending into said piston stepped hole, a cross passage extending through said guide pin and located in said piston stepped hole, and a cross pin in said cross passage of greater length than the diameter of said guide pin and normally engaging said shoulder of said stepped hole and transferring piston retracting force exerted by said spring to urge retraction of said piston, the improvement comprising the combination of: an opening in said housing opening axially into said bore at said one end containing said guide pin head, a selectively removable plug in said opening and normally closing said bore, and means selectively inserted through said opening while said plug is removed and when so inserted engaging said guide pin head with said brake actuated and measuring the amount of movement of said guide pin head relative to said housing required for brake actuation, the amount of movement being a function of brake wear, thus determining the condition of brake wear without disassembly and visual inspection of the brake, said means being removed after determination of the condition of brake wear and said plug then being replaced to close said bore one end.

4,186,823

WHEEL WEDGE

Jack D. White, Jr., Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

Filed Sep. 28, 1978, Ser. No. 946,673
Int. Cl.[2] B60T *3/00*
U.S. Cl. 188—32 **7 Claims**



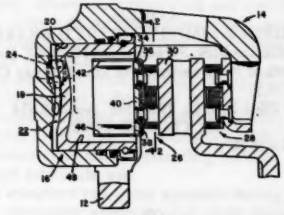
1. A wheel wedge made primarily of an elastomeric material and having a wheel-contacting surface, a first ground-contacting surface comprising a plurality of transversely extending ribs and a second ground-contacting surface comprising a plurality of spaced, generally cylindrical members at least partially embedded in said elastomeric material and having at least a portion of one end section thereof exposed at the face of said second surface, wherein said members have an anchoring portion at one end thereof which extends radially outwardly from the shank of said member, said anchoring portion being completely embedded in said elastomeric material.

4,186,824

ANTI-RATTLE SPRING FOR DISC BRAKE

Gary W. Preston; Donald D. Johannesen, and William J. Kestermeier, all of South Bend, Ind., assignors to The Bendix Corporation, Southfield, Mich.

Filed Jun. 12, 1978, Ser. No. 914,475
Int. Cl.[2] F16D *65/02*
U.S. Cl. 188—73.5 **1 Claim**



1. In a disc brake assembly having a torque member which movably supports a caliper and a pair of friction elements, the caliper cooperating with a piston cup to define a pressure chamber, the piston cup defining a bore opposite the pressure chamber, a resilient member carried within said piston cup bore and cooperating with one of said pair of friction elements to substantially eliminate rattle generated by said one friction element, said resilient member forming a split which permits radial contraction of said resilient member for insertion thereof into said piston cup bore, said resilient member including at least one tab adjacent said split, said one tab extending axially outwardly from said piston cup bore, and said resilient member

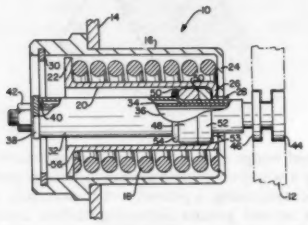
including another tab extending axially outwardly from said piston cup bore substantially diametrically opposite said one tab relative to said piston cup bore, said tabs having radially extending facing portions, said one and other tabs cooperating with each other to expand radially after said resilient member is inserted in said piston cup bore to releasably engage and retain said one friction element therebetween in engagement with said piston cup.

4,186,825

BRAKE ADJUSTER HAVING RESHAPABLE MEMBER DRAWN THROUGH A DIE

Paul E. Milliken, Massillon, Ohio, assignor to Goodyear Aerospace Corporation, Akron, Ohio

Filed Aug. 14, 1978, Ser. No. 933,350
Int. Cl.[2] F16D 65/54
U.S. Cl. 188—196 R **14 Claims**



1. In a braking system including a brake housing and a pressure plate, the improvement of a brake adjuster, comprising:
   - a support member maintained in fixed relationship to the brake housing;
   - reciprocating means operatively associated with said support member for reciprocating movement between first and second ends thereof;
   - a die carried by said reciprocating means and movable therewithin; and
   - a tubular member passing through said die and being operatively connected at one end thereof to the pressure plate and movable therewith, said die being in reshaping contacting engagement with said tubular member at a plurality of spaced-apart contact locations, a clearance being maintained between said die and tubular member between said contact locations.

4,186,826

TORQUE LIMITING CLUTCH BRAKE

William J. MacKendrick, Syracuse, and Harold F. Brown, Skaneateles, both of N.Y., assignors to Lipe-Rollway Corporation, Syracuse, N.Y.

Filed Feb. 10, 1978, Ser. No. 876,674
Int. Cl.[2] F16D 67/02
U.S. Cl. 192—13 R **6 Claims**

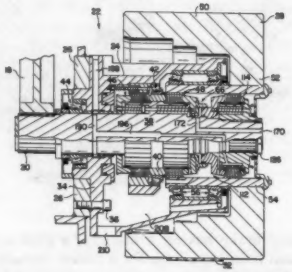
1. A clutch brake unit for retarding the motion of the driven shaft of a clutch assembly wherein the unit is operatively engaged between two coacting members that are adapted to move into contact with the unit to apply a varying load thereto as the clutch is released from engagement with the shaft, the improvement comprising
   - a pair of parallely aligned radially extended discs mounted upon the shaft for rotation therewith and being adapted to move along the shaft in an axial direction, the outer end faces of the discs being arranged to initially engage the two coacting members as the clutch is released and to compress the discs inwardly as the load increases thereby causing the motion of the shaft to be braked,
   - biasing means acting between the two discs for urging them outwardly against the load applied by said coacting members, and
   - a rigid stop means rotatably mounted upon said discs for engaging both coacting members upon the discs being compressed a predetermined distance whereby the amount of braking torque applied to the shaft through the disc is limited.

4,186,827

FLUID OPERATED CLUTCH AND BRAKE

Edwin A. Spanke, Oak Forest, Ill., assignor to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed Jun. 22, 1978, Ser. No. 918,101
Int. Cl.[2] F16D 67/04
U.S. Cl. 192—18 A **20 Claims**



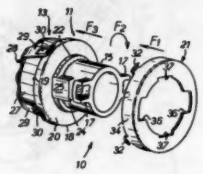
1. A press drive mechanism comprising a housing, shaft means extending through said housing and supported thereby for rotation about an axis, a flywheel at one end of said housing and including sleeve means extending axially inwardly of said housing about said shaft means and having axially inner and outer portions, means supporting said flywheel for rotation relative to said housing and shaft means, primary brake means between said housing and shaft means, primary clutch means between said shaft means and said axially inner portion of said sleeve means, said axially outer portion of said sleeve means surrounding an axial portion of said shaft means in radially spaced relationship therewith to define a circumferential chamber therewith, auxiliary clutch means between said axially outer portion of said sleeve means and said axial portion of said shaft means, said auxiliary clutch means including support means removably mountable in said chamber and carrying auxiliary clutch disc means and auxiliary clutch disc presser means and abutments means for removal therewith as a unit from said chamber, and brake and clutch operating means to alternately engage said primary brake means and said primary clutch means and to simultaneously engage said primary and auxiliary clutch means when said auxiliary clutch means is in said chamber.

4,186,828

CLUTCH RELEASE BEARINGS

Pierre J. Renaud, Le Plessis-Trevise, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France

Filed Jul. 5, 1978, Ser. No. 922,190
Claims priority, application France, Jul. 8, 1977, 77 21044; Jan. 4, 1978, 78 00176
Int. Cl.[2] F16D *19/00*
U.S. Cl. 192—98 17 Claims



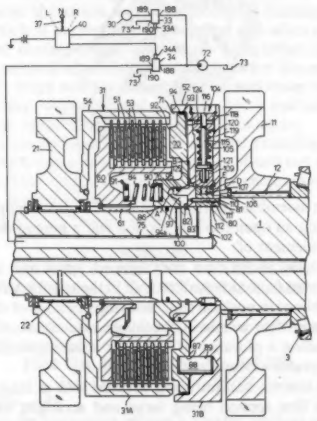
1. Clutch release bearing of the type including an annular operating member having a retaining portion for retaining said operating member axially relative to release fork and displacement therewith, an annular drive member normally disposed coaxially of said operating member and having an actuating part adapted to actuate release means of a clutch, means clamping said drive member to said operating member, said operating member having a transverse face axially intermediate said retaining means and said drive member, an annular bearing plate member overlying said transverse face and providing a bearing surface for a release fork, the improvement comprising at least one notch along the inner periphery of said annular bearing plate member and an interlock portion on said operating member cooperable with said notch for preventing rotation of said bearing plate member relative to said operating member.

4,186,829

MODULATABLE POWER TRANSMISSION CLUTCH

Raymond C. Schneider, and Paul A. Pelligrino, both of Rockford, Ill., assignors to Twin Disc, Incorporated, Racine, Wis.

Filed Nov. 14, 1977, Ser. No. 850,961
Int. Cl.[2] F16D *25/00*
U.S. Cl. 192—109 F 3 Claims



1. In a modulatable power transmission clutch:

a fluid operated movable piston for effecting clutch operation and having separate fluid application piston areas thereon, one of said piston areas being adapted to have fluid flow directed thereto at a variable fluid pressure whereby said clutch is modulatable, the other of said piston areas being adapted to have fluid flow directed thereto to effect maximum and unmodulatable engagement of said clutch;

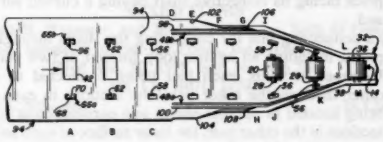
and valve means for controlling fluid flow to said other of said piston areas in response to fluid pressure at said one of said piston areas, said valve means including a normally closed first valve which opens fully to permit fluid flow to said other piston area when fluid pressure at said one piston area exceeds a predetermined value and re-closes when said pressure falls below said predetermined value, said valve means further including a normally open second valve actuatable to closed position by movement of said first valve to open position which closes fully to prevent fluid flow from said other piston area when said first valve opens and which re-opens fully to permit fluid flow from said other piston area when said first valve re-closes fully, said valve means also including spring means for biasing said first valve to closed position and said second valve to open position, said first valve including a surface area against which fluid pressure acts which increases in size when said first valve opens to thereby increase the force with which said first valve moves to fully open position.

4,186,830

ROLLER ASSEMBLY FOR PACKAGE FLOW SYSTEMS

Robert L. Corey, Chicago, and Frederick E. Ullman, Glencoe, both of Ill., assignors to Unarco Industries, Inc., Chicago, Ill.

Filed Mar. 2, 1978, Ser. No. 882,732
Int. Cl.[2] B65G *39/02*
U.S. Cl. 193—35 R 15 Claims



1. A roller assembly for use in a package flow system for conveying, supporting and storing a load such as packages, cartons, containers and other articles, upon a support frame, comprising:

a roller having an outer cylindrical load-supporting surface for engaging, dynamically supporting and conveying said load, said roller rotating about a lateral axis and defining shaft-receiving socket portions providing cylindrical bearing surfaces along said lateral axis; and

a unitary one-piece rail frame assembly for rigidly and rotatably supporting said roller, said unitary one-piece rail frame assembly including an elongated generally channel-shaped frame having a pair of generally upright side walls and an intermediate section extending between and connecting said side walls; and

said unitary one-piece rail frame assembly having a pair of generally stationary axially spaced shaft sections positioned in general alignment with each other generally along said lateral axis for insertion into said shaft-receiving socket portions of said roller to rotatably support and engage said cylindrical bearing surfaces of said roller, said axial spaced shaft sections, including a first shaft section extending integrally and laterally inwardly from one of said upright side walls of said channel-shaped frame and a second shaft section extending integrally and laterally inwardly from the other of said upright side walls of said channel-shaped frame in a direction generally towards said first shaft section, and each of said shaft sections having an outer surface extending integrally inwardly from the side walls of said channel-shaped frame with

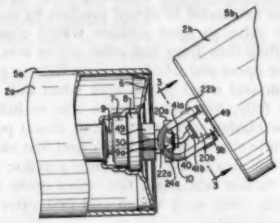
portions facing upwardly to provide an upper bearing frame surface upon which said roller can rotate.

4,186,831

CONNECTOR FOR CATENARY CONVEYOR BELT IDLER ROLLS

Richard N. Mercurio, and Richard B. Graham, both of Columbus, Ohio, assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Sep. 7, 1977, Ser. No. 831,326
Int. Cl.[2] B65G *45/02, 15/60*
U.S. Cl. 198—501 **6 Claims**



1. A pivotal connection for adjacent shafts comprising:
(a) a pair of shafts disposed so that an end of one shaft is juxtapositioned relative to an end of the other shaft;
(b) an idler roller mounted for rotation about each shaft;
(c) pivot means including a pair of oppositely extending, aligned pivots rigidly connected to the juxtapositioned end of each shaft, the pivots on one shaft being oriented 90° relative to the pivots on the other shaft and projecting radially relative to its respective shaft, the side of each pivot facing its respective shaft having a curved surface; and
(d) a connecting link for connecting the shafts through the pivots including an endless loop formed of two pairs of U-shaped sections, each pair being connected to each other through the other pair, the sections in each pair being located in parallel planes and perpendicular to the sections in the other pair, the inner surface of each section cooperating with and engaging a pivot and being shaped to conform to the curved surface of its cooperating pivot, so that each shaft can pivot in one plane through relative movement of the pivot curved surfaces and connecting link inner surfaces, the shafts together pivoting in perpendicular planes relative to each other, the pivot means includes a central body and a pair of pivots, projecting colinearly from opposite sides of the central body, the central body includes a pair of appendages extending perpendicular to the pivots, the distance between the distal ends of the appendages being greater than the width of the cooperating pair of U-shaped sections such that the central body cannot slide free from the connecting link in the direction parallel to a line through the radial centers of the pair of sections.

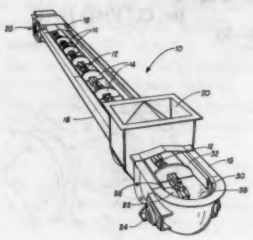
4,186,832

CONVEYOR FOR HANDLING FREE-FLOWING MATERIAL

Hugh D. Kelley, 1451 Morgantown, Wichita, Kans. 67212

Filed Aug. 18, 1978, Ser. No. 934,896
Int. Cl.[2] B65G *21/20*
U.S. Cl. 198—861 **7 Claims**

1. In a conveyor having a round bottom trough for receiving free-flowing material therein, the conveyor having an endless chain with flights thereon or a screw for moving the free-flowing material along the length of the trough, the improvement comprising:
a plurality of "U" shaped liners contoured to fit on top of the round bottom trough, said liners placed end to end on top of the round bottom trough with sufficient space placed between the ends of said liners to allow for lengthwise expansion of said liners; and
a plurality of resilient pressure blocks mounted along the sides of the trough in a spaced relationship to each other and butted against the edges of said liners, said pressure



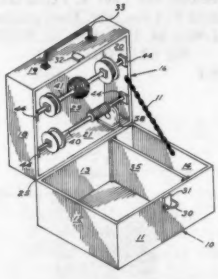
blocks having apertures for receiving bolts therethrough, said bolts received through apertures in the sides of the trough and attached thereto, said pressure blocks permitting said "U" shaped liners to expand and contract transverse to the length of said liners.

4,186,833

GIFT WRAPPING STORAGE CONTAINER

Virginia L. Homan, 11793 E. Jewell Pl., Aurora, Colo. 80012

Filed Sep. 13, 1978, Ser. No. 941,861
Int. Cl.[2] B65D *85/67*
U.S. Cl. 206—225 **2 Claims**

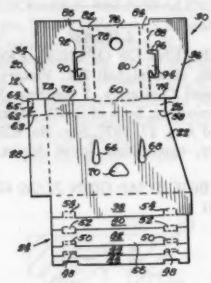


1. In an assembled storage container for gift wrapping materials having an open top box section and a hinged domed top, the improvement of:
(a) at least about two rods spaced apart and releasably mounted from side wall to wall in the top for holding reels of ribbons in position for retrieving portions of the ribbon;
(b) elastic tape means in the hinge side of the domed top including a plurality of loops for securing small items in retrievable storage position;
(c) the bottom section being divided into at least two sections, the first section being large and arranged as a folded paper storage compartment and the second being small, and said sections being divided by wall means; and
(d) pocket means having a closing biased elastic top on said wall means in said small section arranged to hold cards and stickers.

4,186,834
SHIPPING AND STORAGE CONTAINER

George W. Krack, Evansville, Ind., assignor to Inland Container Corporation, Indianapolis, Ind.

Filed Sep. 11, 1978, Ser. No. 941,056
Int. Cl.[2] B65D 85/54, 85/64
U.S. Cl. 206—320 18 Claims



1. A shipping and storage container for an elongated article, comprising:

a pair of end caps for disposition in surrounding relation to the end portions of the article,

each said end cap being unitary and from a single precut sheet and including

a generally planar outer end wall,

a cushion member hingedly attached along the lower edge of said outer end wall and positioned to extend inwardly and generally normal thereto,

a ledge hingedly attached along the upper edge of said outer end wall and extending inwardly and generally normal thereto, said ledge serving as a support surface when stacking similar containers, and an inner end wall hingedly attached along its upper edge to said ledge and folded to a position generally adjacent the inner surface of said outer end wall, said inner end wall including a portion spaced inwardly from said outer wall and wing portions on either side thereof located immediately adjacent said outer wall, said spaced portion defining a hollow vertical support member and extending generally between said cushion and said ledge and providing support therebetween for the article and the ends of said container when the article is packed in said container and when similarly packed containers are stacked on each other, and said wing portions extending generally between the underside of said ledge and the lower edge of said outer wall and providing additional end wall thickness and additional vertical support for the ends of said container;

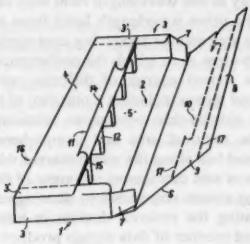
and an outer wrapper of foldable material extending around the article and at least the peripheries of said end caps and secured to said end caps to completely enclose said article when packed in said container.

4,186,835
BOX FOR AMPOULES HAVING A PACKAGING INSERT THAT PROVIDES A CLOSURE ARRANGEMENT AND REINFORCEMENT

Otto Hofer, Schaan, Liechtenstein, assignor to Interondo AG, Buchs, Switzerland

Filed Oct. 10, 1978, Ser. No. 950,179
Int. Cl.[2] B65D 5/54, 83/04
U.S. Cl. 206—443 5 Claims

1. A box for packaging elongate articles, such as ampoules, comprising a box body formed by folding and gluing operations and including a rear wall having two side edges, a bottom edge and a top edge, two side walls respectively extending forward from said side edges of said rear wall and having parallel front edges, a front wall extending between said front edges of said side walls, said front wall being of less area than said rear wall, thereby forming with said side walls an open area, a cover extending from said top edge of said rear wall and formed to cover said open area, means for detachably securing said cover to said front wall, and an insert for packaging the elongated articles and including firstly a support formed and secured to lie against the inside surface of said front wall for

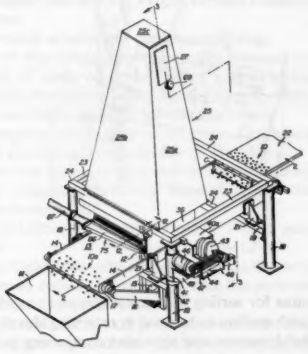


the purpose of strengthening said front wall and secondly a corrugated cardboard strip adhered to said support for receiving the elongated articles respectively in corrugations thereof, said front wall and said support being formed to provide a pocket open toward the top of the box, said means for detachably securing said cover to said front wall comprising a tongue portion formed on said cover for insertion into said pocket.

4,186,836
DIFFERENTIAL REFLECTIVITY METHOD AND APPARATUS FOR SORTING INDISCRIMINATELY MIXED ITEMS

Norman B. Wassmer, and Joseph L. Hodges, both of Ontario, Oreg., assignors to Ore-Ida Foods, Inc., Boise, Id.

Filed Apr. 10, 1978, Ser. No. 895,256
Int. Cl.[2] B07C 5/344
U.S. Cl. 209—565 24 Claims



1. Apparatus for sorting indiscriminately mixed items, some of which have a predetermined relationship between two mutually different wavelength bands of energy reflected therefrom, and others of which have other than said predetermined relationship, comprising means defining a viewing area; means defining a removal area; means for passing such a mixture into and through the viewing area as a heterogeneous bed, whose thickness is substantially no greater than the thickness of individual items and wherein the individual items are unsegregated, and for passing said bed into and through the removal area after a predetermined amount of time has passed following its passage through the viewing area; means for flooding the

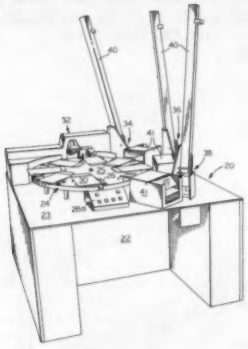
viewing area with radiant energy containing the two mutually different wavelength bands in a substantially integrated spread throughout said viewing area; sensing means including a plurality of paired sensing devices focused on the viewing area so as to view corresponding contiguous sub-areas of said viewing area, the paired devices being adapted to sense the two different wavelength bands, respectively, of energy reflected from the corresponding sub-areas; means for comparing the sensed radiant energy of one wavelength band with the sensed radiant energy of the other wavelength band from each sub-area of said viewing area and for producing data signals, respectively, for those sub-areas as to which the predetermined relationship between the sensed energy of different wavelength bands exists; removal means including a plurality of removal devices arranged in side-by-side contiguous relationship across the width of the removal area and comprehending respective portions of said bed along the width thereof which correspond to a plurality of said contiguous sub-areas of the viewing area; and operating means responsive to data signals, for independently operating the removal devices in accordance with a predetermined number of data signals produced for respective corresponding pluralities of contiguous sub-areas of the viewing area, so as to remove from the bed any of said portions thereof which have produced the predetermined number of data signals.

4,186,837

AUTOMATED FILM CARTRIDGE AND MAILER SORTING AND CORRELATING APPARATUS

Stanley Popiel, Stonington; R. Clark DuBois; Jay L. Carley, both of Fairfield, and John C. Hamma, Milford, all of Conn., assignors to Mystic Color Lab, Inc., Mystic, Conn.

Filed Dec. 27, 1978, Ser. No. 973,612
Int. Cl.[2] B07C *5/34*
U.S. Cl. 209—565 **35 Claims**



1. Apparatus for sorting film cartridges and correlating the cartridges with mailers to be used in returning developed film to their rightful owners; said apparatus comprising in combination:

A. a conveyor having a series of conveyor sections, each accommodating a cartridge and mailer in physically correlated relation;

B. a loading station at which said conveyor sections are successively presented for loading of a cartridge and mailer thereon;

C. means for indexing said conveyor in stepwise fashion;

D. a memory into which data identifying the type of film in each cartridge is successively entered;

E. a dual labeling station to which said conveyor sections are successively presented, said labeling station including transport means for applying to a cartridge and mailer thereat separate labels, each preprinted with unique, correlating indicia;

F. a plurality of discharge stations to which said conveyor sections are successively presented; and

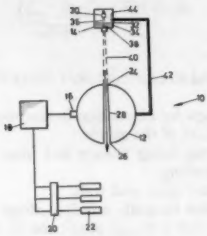
G. means controlled by the data in said memory for off-loading each labeled cartridge into a selected one of said discharge stations in accordance with the type of film therein.

4,186,838

MEASUREMENT OF OPTICAL PROPERTIES

Charlie M. Levitt, 40 Craighall Rd., Victory Park, Johannesburg, and Samuel Chatterley, 1 Reithaan St., Florida Lake, Florida, Johannesburg, both of South Africa

Filed Aug. 17, 1977, Ser. No. 825,390
Claims priority, application South Africa, Aug. 27, 1976, 76/5149
Int. Cl.[2] B07C *5/342*; G01N *21/26*; G01J *3/38*
U.S. Cl. 209—581 **11 Claims**



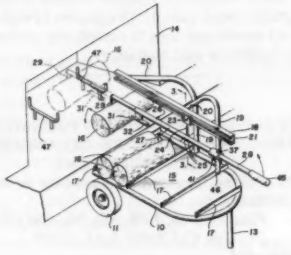
10. A method of sorting articles according to the reflectance of the articles which includes the steps of passing the articles in succession through an integrating sphere, illuminating each article with a beam of radiation of a suitable wavelength directed along the path of the article after the article has passed through the sphere, detecting the radiation reflected by the article onto the internal wall of the sphere, and sorting the article according to the detected radiation.

4,186,839

CRANE FOR HANDLING FIREPLACE OR WOOD STOVE LOGS

Vence V. Majors, Rte. 2, Hardy, Ark. 72542

Filed Apr. 20, 1978, Ser. No. 898,088
Int. Cl.[2] B66C *3/00*; B60P *1/54*
U.S. Cl. 212—135 **4 Claims**



1. A crane for handling fire logs comprising a wheeled support, a substantially horizontal track on said support, a log grapple having relatively movable log engaging grapple jaws and means for releasably locking said jaws in selected relative positions, and a flexible suspension means for said grapple on

said track and movable freely with the grapple in opposite directions on said track, said log grapple being a manually operated grapple in which said jaws are relatively movable on a linear path, and said means for releasably locking said jaws comprising a spring-biased manually released friction locking device for one jaw and having engagement with the other jaw.

4,186,840

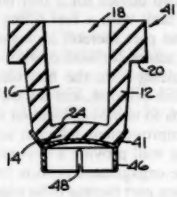
CANNULAPIERCEABLE, SELF-SEALING CLOSURE

Edward P. Percarpio, North Haledon, N.J., assignor to Becton, Dickinson and Company, Rutherford, N.J.

Division of Ser. No. 880,474, Feb. 23, 1978, Pat. No. 4,136,794, which is a division of Ser. No. 729,643, Oct. 5, 1976, Pat. No. 4,111,326, which is a continuation-in-part of Ser. No. 663,921, Mar. 4, 1976, abandoned. This application Sep. 13, 1978, Ser. No. 942,055

Int. Cl.[2] B65D *39/04*

U.S. Cl. 215—247 **2 Claims**



1. A cannula pierceable, self-sealing, gas proof closure for sealing an open end of an air evacuated blood collection tube, which comprises;

(a) a tubular elastomeric body having

(i) flexible, elastic sidewalls;

(ii) an open first end; and

(iii) a closed second end formed by a cannula pierceable, flexible, elastic end wall integral with said sidewalls;

(b) a flange disposed radially about the periphery of said sidewalls adjacent to said first end; and

(c) a protective cap adhered to the outside of said closed second end and

wherein said cap has a shirt portion adapted to be nested in the open end of a tubular container prior to insertion of said closure into an air evacuated container;

said end wall having a convex inner surface and a concave outer surface when pressure on inner and on outer surfaces is equal, said tubular body having a diameter which bears a ratio to the height of the body of about 0.8:1 and to thickness of the second end of from 5.4:1 to 12.1:1;

whereby when the closure is emplaced in and sealing an open end of an air evacuated tube, the higher pressure on the convex inner surface of the end wall as compared to the lower pressure (vacuum) exerting itself on the concave outer surface creates a pressure differential on the end wall, flexing and flattening the concave-convex configuration and creating a radial force directed toward the periphery of the end wall, said force effecting a restraining and sealing force between the closed second end of the elastomeric body and the air evacuated tube.

4,186,841

PALLET

Albert P. Buckley, Cohasset, and Melville R. Dill, Jr., Boston, both of Mass., assignors to Federal Reserve Bank of Boston, Boston, Mass.

Filed Sep. 29, 1977, Ser. No. 837,739

Int. Cl.[2] B65D *7/26, 21/02*

U.S. Cl. 220—6 **11 Claims**

1. A foldable, stackable pallet comprising:

(a) a support frame;

(b) a plurality of support feet associated with said frame, each having a substantially rectangular cross section;

(c) two inwardly foldable end walls;

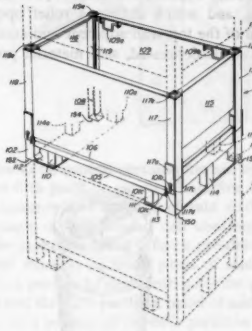
(d) first and second pairs of support columns, each pair associated with a respective one of said end walls and each column having a substantially rectangular cross section;

(e) means for pivotally attaching each of said support columns to a respective one of said support feet;

(f) a pair of removable side walls which are storable on said frame;

each of said support feet and each of said columns having an upwardly extending protrusion formed on an upper end thereof and a cooperative recess formed on a lower end thereof and defined by side walls thereof;

the recess formed on each of said support feet being adapted to selectively receive a protrusion formed on an upward end of a corresponding one of said columns of another pallet stacked therebelow in an extended condition and a protrusion formed on an upward end of a corresponding one of said support feet of another pallet stacked therebelow in a folded condition;



the recess on each of said columns being registrable with a protrusion formed on an upper end of an associated one of said support feet to form a rigid, vertical connection therebetween;

said pivotable attachment means comprising:

a pair of depending plates externally disposed on opposite sides of each of said columns and extending downwardly therefrom to engage the corresponding sides of an associated support foot therebetween;

an elongated slot in at least one plate of each pair of plates and extending longitudinally of the plate;

a transverse pivot pin disposed on each of said support feet and extending therefrom through a respective one of said slots;

a notch formed in at least one plate of each pair of plates; and

a stop registrable with said notch when the recess on said support column is registered with the protrusion in said associated support foot;

said stop, said notch, said pivot pin, said slot, said recess in said support column and said protrusion on said support foot in combination being operable to produce said rigid vertical connection.

4,186,842

DISPOSABLE DRINKING CUP WITH VALVED LID

Kenneth J. Albert, Beverly Hills, Calif., assignor to Inventor's Inc., Los Angeles, Calif.

Filed Oct. 27, 1977, Ser. No. 845,898

Int. Cl.[2] A47G *19/22*

U.S. Cl. 220—206 **4 Claims**

1. In a disposable drinking cup with a valved, circular lid including a frusto-conical cup having an open top and of a

good heat-insulating material, said lid comprising a top wall having a periphery with a skirt depending therefrom, said lid being detachably mounted on said open top by a snap connection including an annular groove in the lid immediately adjacent to the periphery of the lid, said lid being of a flexible elastic plastic having heat-insulating properties, the improvement to the lid comprising:

(a) a first arcuate slit, the concave side of said first arcuate slit opening radially inwardly toward the center of said circular lid, the first slit extending through said top wall from its top surface to its under surface in close proximity to the periphery of said circular lid, said slit providing a drinking opening when the material of the top wall adjacent said concave side is depressed, said material providing a valve member which normally resiliently closes said drinking opening;

(b) a second arcuate slit, the concave side of said second arcuate slit opening radially inwardly toward the center of said circular lid, the second slit extending through said top wall from its top surface to its under surface in a position diametrically opposite the first slit providing the drinking opening, and which defines a relief opening when the material of the top wall adjacent said concave side of the second slit is depressed, said material providing a relief

valve which normally resiliently closes said relief opening;

(c) a straight reinforcing rib upstanding from said top wall and extending between said valve member and said relief valve with one end portion of said rib terminating within the area defined and bordered by said first arcuate slit and with the remaining end portion of said rib terminating within the area defined and bordered by said second arcuate slit, the area defined and bordered by the first and second arcuate slits being bounded by an imaginary straight line connecting the end points of the arcs of the respective first and second arcuate slits whereby downward pressure on said rib causes deflection of said top wall to move said valve member and said relief valve, opening said drinking opening and said relief opening; and

(d) a generally circular reinforcing rib upstanding from said top wall and radially inwardly of and concentric with said periphery and spaced radially outwardly of said relief opening with the generally circular formation of said reinforcing rib being interrupted by a U-shaped formation, the open end of said U-shaped formation being directed radially outwardly toward said first arcuate slit, the interposition of said U-shaped formation preventing the otherwise intersection of said generally circular reinforcing rib and said first arcuate slit.

4,186,843

CLOSURE CAP DEVICE FOR A FUEL TANK OF A MOTORCYCLE

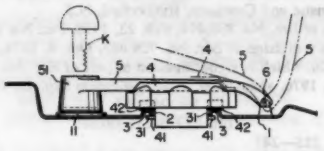
Yoshitaka Omori, Fujimi, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 21, 1978, Ser. No. 944,394

Claims priority, application Japan, Sep. 28, 1977, 52-130244[U]

Int. Cl.[2] B65D *55/14, 45/23*

U.S. Cl. 220—210 **2 Claims**



1. In a closure cap device for a fuel tank of a motorcycle comprising a fuel tank with a fuel filling port, defined by a wall, formed in one part thereof, a closure cap for said fuel filling port, lever means for said closure cap to prevent the same from demounting from the fuel filling port when said lever means is in one position, and a lock engagement means for said lever means to unmovably fasten the same across said closure cap, the improvement wherein said closure cap and filling port-defining wall provide a bayonet structure and said cap has at least one engagement portion formed diametrically across the top surface part thereof to be engaged with the lever means, said engagement portion being in a tapered form; the lever means is also in a tapered form toward the tip end thereof, conforming with the shape of said tapered engagement portion; pivot means mounted on the top surface part of said fuel tank body near said closure cap, to which the opposite end of said lever means is pivotally mounted to be snugly received and fitted with said diametrically extending tapered engagement portion of said closure cap; said lock engagement means comprises a lock provided at the tip end part of said tapered lever means opposite said pivotally supported end thereof, and a socket is provided on the top surface of said fuel tank body, said engagement means being mutually engaged when said lever means is fitted with said engagement portion in said closure cap at the time of perfect tight-fitting of said closure cap onto said fuel filling port of the fuel tank body; and the top surfaces of said lever means and said lock engagement means, when they are tightly engaged with said closure cap and fastened, are generally flush with the top surface of said fuel tank body to maintain flatness on the top surface of the fuel tank.

4,186,844

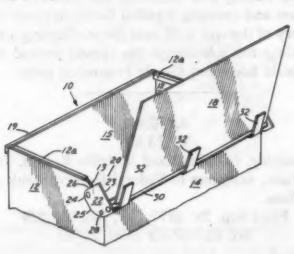
EASY OPENING TRASH BIN LID

Raymond Swanson, 5090 N. 109th, Longmont, Colo. 80501

Filed Jan. 29, 1979, Ser. No. 7,662

Int. Cl.[2] B65D *43/14, 51/04*

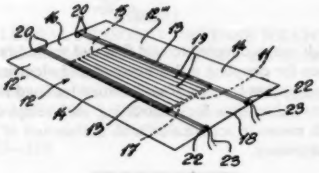
U.S. Cl. 220—333 **9 Claims**



1. A hinged lid rectangular trash container comprising:

(a) a container having two side walls, front and rear walls, and a bottom, providing a full open top and planar lid means therefore,
(b) said side walls having opposed cut-off corners adjacent said rear wall,
(c) said rear wall being smaller in height than said front wall and joining at said cut-off of said side walls,
(d) hinge means on each side of said container including plate means mounted on pivot means pivotally connected to each said side wall at a point forward of said rear wall, and each said plate arranged to pivot about said povot means,
(e) stop means associated with each said plate means limiting clockwise and counterclockwise pivotal movement of each said plate means, and
(f) lid hinge means including plate connecting means and pivotal connecting means at the rear edge of said lid means to said plate connecting means, providing pivoting movement of said lid means, independant of said plate means.

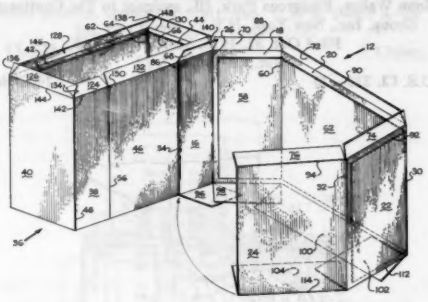
4,186,845
CONTAINER LINER
Victor T. Fodd, 255 Beverly Ave., Montreal, Quebec, Canada
Filed Aug. 1, 1978, Ser. No. 929,964
Int. Cl.² B65D *25/14, 25/16*
U.S. Cl. 220—461 **7 Claims**



1. A liquid impervious liner for use in shipping containers, said liner comprising a base sheet of cushioning material and a top cover sheet of polymeric material bonded to said base sheet by a plurality of spaced apart continuous seal strips extending entirely across said base sheet, said top cover sheet having panel portions extending beyond the periphery of said base sheet, said panel portions being portions of said top cover sheet extending beyond a front, rear and opposed side edges of said base sheet to constitute a front, rear and side panels, said top cover sheet being constituted by three rectangular sheets; a first of said sheets being bonded to said base sheet, which is also rectangular, by said plurality of seal strips and protruding beyond said front and rear edges of said base sheet to constitute said front and said rear panel; a second and third one of said sheets overlapping said first sheet at a respective side edge portion thereof and sealed thereto by a plurality of closely spaced continuous seal strips, said second and third sheets constituting said side panels.

4,186,846
BULK MATERIAL CONTAINER
Richard P. Jacalone, Owosso, Mich., and Lewis D. Poggiali, West Chester, Ohio, assignors to Olinkraft, Inc.
Filed Jan. 5, 1979, Ser. No. 1,119
Int. Cl.² B65D *1/42, 5/32, 5/48*
U.S. Cl. 220—468 **8 Claims**

1. A bulk material container having two cells laminated together along one of their respective walls to form a double thickness center partition, said container also being formed with double thickness side and end walls having no external manufacturer's joint, the container comprising:
(a) a first cell formed from a series of hingedly connected wall panels consisting of a first partition panel, a second outer wall panel, a third outer wall panel, a fourth outer wall panel, and a fifth partition panel;
(b) a second cell formed from a series of hingedly connected wall panels consisting of a sixth partition panel, a seventh outer wall panel, and eighth outer wall panel, a ninth outer wall panel, and a tenth partition panel;
(c) a pair of reinforcing liners, each liner being formed from a series of three hingedly connected wall panels, one of said liners being laminated to the second, third, and fourth outer panels of the first cell and the other of said liners being laminated to the seventh, eighth, and ninth outer panels of the second cell;



(d) a double thickness central partition formed by an edge of said first and fifth partition panels of said first cell abutting to form a juncture and an edge of said sixth and tenth partition panels of said second cell abutting to form a juncture, the junctures being offset a pre-determined distance so that the first partition panel of said first cell is laminated to a portion of said tenth partition panel of said second cell and the sixth partition panel of said second cell is laminated to a portion of the fifth partition panel of the first cell, the remaining portions of the fifth and tenth partition panels also being laminated together to complete the formation of the central partition of the bulk material container.

4,186,847
METHOD AND APPARATUS FOR DEFLECTING A STREAM OF SPREADABLE PARTICLES
Walter Wirz, Thalwil, Switzerland, assignor to Dr. Peter Fahrni, Kilchberg, Switzerland
Filed Apr. 19, 1976, Ser. No. 678,230
Claims priority, application Switzerland, Apr. 24, 1975, 5258/75
Int. Cl.² B65G *31/04*
U.S. Cl. 222—1 **1 Claim**

1. A method for monitoring the operation of an apparatus for distributing particles in order to form a mat of particles wherein said apparatus includes a rotatable hollow cage cylinder having a perforated circumferential shell through which the particles to be distributed normally pass when the cage

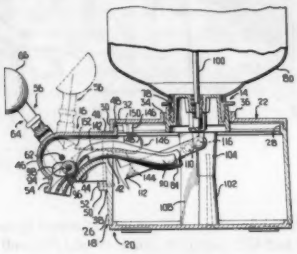
cylinder is rotated in a first direction, said method comprising the steps of: reversing the direction of rotation of the cylinder from said first direction and increasing the speed of rotation of the cage cylinder such that particles fed to the perforated shell cannot pass therethrough but are impelled in a different direction; capturing the impelled particles; and conveying the captured impelled particles to a measuring device for monitoring.

4,186,848

BASE TYPE DISPENSER FOR BOTTLE-LIKE CONTAINER WITH COLLAPSIBLE DISPENSING AND VENT LINES

John Walter, Evergreen Park, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Oct. 31, 1978, Ser. No. 956,163
Int. Cl.[2] B67D *5/12*
U.S. Cl. 222—23 **16 Claims**



1. A dispenser for controllably dispensing a liquid from a product container, said dispenser comprising a base having an upper portion, a fitment carried by said base upper portion in an upstanding position for attaching an end fitment of an inverted product container to said base in sealed engagement with said fitment, a dispensing line and a vent line extending through said fitment for constant communication with the interior of an attached product container, a simulated spigot carried by said base remote from said fitment, said vent line and said dispensing line each having a collapsible tube portion extending from said fitment into said spigot and terminating thereat, said spigot including a fixed backup member and a movable handle member carrying a clamping member cooperable with said backup member normally to collapse said tube portions to prevent both dispensing and venting.

4,186,849

CONTROL CIRCUIT FOR AUTOMATICALLY MONITORING, DISPENSING, AND FILLING A LIQUID IN A CONTAINER

Searle T. Spangler, 2 Forian Ct., Westport, Conn. 06880

Filed Apr. 4, 1978, Ser. No. 893,484
Int. Cl.[2] B67D *5/08, 5/32;* G08B *21/00*
U.S. Cl. 222—25 **7 Claims**

1. A control circuit for automatically monitoring, dispensing and filling a liquid in a container of the type in which a concentrate is first added to the container and then automatically diluted under the control of said control circuit, comprising in combination

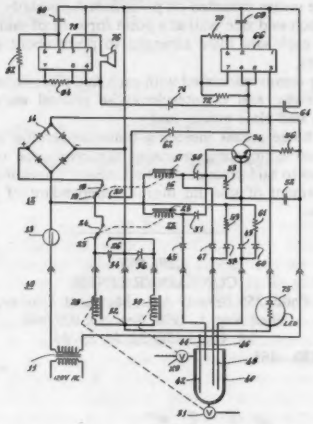
(a) a container for holding and dispensing liquid therefrom having a plurality of separated electrically conductive probes of different lengths extending to different depths within said container,

(b) a drain solenoid valve coupled to said container for dispensing liquid from said container when said drain solenoid valve is activated,

(c) a fill solenoid valve coupled to said container for adding liquid to said container when said fill solenoid valve is activated,

(d) a first relay having first and second contacts, said first contact when closed adapted to apply power to said solenoid valves,

(e) a second relay having first and second contacts coupled to said first contact of said first relay for activating said drain solenoid valve or said fill solenoid valve when said first or second contacts of said second relay, respectively, are closed,



(f) switch means coupled to said first and second relays, and

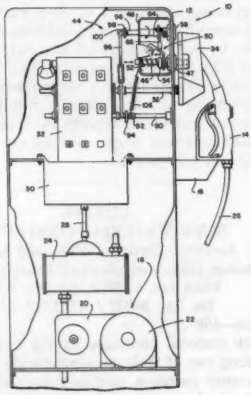
(g) means for coupling at least one of said electrically conductive probes to each of said first and second relays and said switch means for controlling said relays and said switch means in accordance with the amount of liquid in said container.

4,186,850

GASOLINE PUMP ASSEMBLY AND LOCK ARRANGEMENT ESPECIALLY SUITABLE FOR USE THEREWITH

Joseph A. Mahar, San Francisco, Calif., assignor to Mahar & Parsons, Belmont, Calif.

Filed May 1, 1978, Ser. No. 901,650
Int. Cl.[2] B67D *5/24*
U.S. Cl. 222—28 **14 Claims**



1. A gasoline pump assembly, comprising:

(a) an assembly housing;

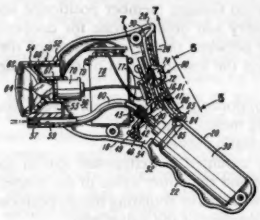
(b) a dispensing nozzle located outside said housing;
(c) means including a pump located within said housing for providing a flow of gasoline to said nozzle from a supply thereof;
(d) handle means mounted on said housing for movement between a first position for closing the flow of gasoline from said supply to said nozzle and a second position for opening said flow of gasoline to said nozzle; and
(e) an arrangement connected with said housing for releasably locking said handle means in said first flow closing position, said arrangement including
(i) a longitudinal locking pin at least partially located within said housing,
(ii) means located within said housing and supporting said locking pin for axial movement between a first position such that one end portion of said pin extends out beyond an outer surface of said housing and interlocks with said handle means when the latter is in its flow closing first position for preventing said handle means from moving to its flow opening second position and a second non-interlocked position longitudinally inward from its first position out of the path of movement of said handle means, and
(iii) key actuated means located within said housing for moving said locking pin from its interlocked position to its non-interlocked position, said key actuated means including a key hole accessible from outside said housing and adapted to receive a key for moving said locking pin to its non-interlocked position.

4,186,851

NON-LETHAL PERSONAL DEFENSE WEAPON

Burton M. Cantor, Las Vegas, Nev., assignor to Personal Security Concepts, Inc., Columbus, Ohio

Continuation of Ser. No. 771,786, Feb. 24, 1977, abandoned.
This application Jul. 20, 1978, Ser. No. 926,270
Int. Cl.[2] B67D *5/66*
U.S. Cl. 222—113 **15 Claims**



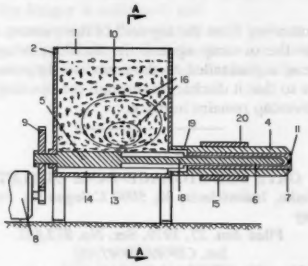
1. A non-lethal personal defense weapon comprising a housing, means for delivering from said housing a jet-like discharge of fluid having a capability of deterring attackers including means operable to activate the fluid discharge, means connected with said housing for emitting a beam of light, an operator device in connection with said housing movable in a substantially linear path, said operator device including, in association therewith and responsive to movement thereof means to actuate said light emitting means and substantially immediately after the actuation of said light emitting means to actuate said means operable to activate a discharge of fluid, said means to actuate said light emitting means and responsive to movement of said operator means including a normally open circuit, a circuit closure means being provided in connection with a portion of said actuating means and said actuating means being inclusive of a further portion which functions to induce the operation of said means operable to activate a discharge of fluid in the course of its movement in said substantially linear path, said housing comprising a rigid grip portion embodying a container of said fluid and a main body portion housing a power source for said light emitting means, said fluid delivery means being extended through said main body portion to and through an opening in a wall portion of said main body portion of said housing which mounts therein said light emitting means and said operator device being reciprocably movable along and in contact with an edge wall portion of said main body portion adjacent said rigid grip.

4,186,852

APPARATUS FOR MELTING AND EXTRUDING THERMOFUSIBLE MATERIAL

Luigi F. Braga, Milan, Italy, assignor to Viscodynamics Corporation, Bure, Switzerland

Filed Jun. 3, 1977, Ser. No. 803,146
Claims priority, application Italy, Jun. 7, 1976, 24007 A/76
Int. Cl.[2] B67D *5/62*; G01F *11/22*
U.S. Cl. 222—146 HE **8 Claims**



1. An apparatus for the continuous melting and extrusion of thermofusible materials which are poor conductors of heat, which comprises a feeding and a prefusion chamber, means for heating said feeding and prefusion chamber, a shaft capable of rotation at the base of said chamber and located along a substantial portion thereof, said shaft while in rotation mixing and recycling said thermofusible material, means for activating said shaft, said shaft comprising a first cylindrical portion and a second portion in the form of a first helicoidal screw, extrusion means comprising an extrusion screw axially connected to said shaft, said extrusion screw being located in a cylindrical tubular structure extending from said chamber, exit means for the thermofusible material in said cylindrical tubular structure, said extrusion screw comprising a second helicoidal screw, said first helicoidal screw being of greater diameter than said second helicoidal screw, said cylindrical tubular structure being divided into two portions, the first portion engaging said first helicoidal screw and being of greater internal diameter than the second portion, whereby at least a portion of said thermofusible material is axially recycled to said feeding and prefusion chamber, prior to reaching said second helicoidal screw.

4,186,853

CONTINUOUS AEROSOL DEVICE

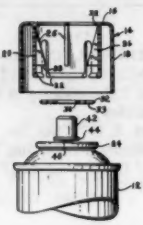
Barry F. White, Merrimack, N.H., assignor to Summit Packaging Systems, Inc., Manchester, N.H.

Filed Jan. 22, 1979, Ser. No. 5,484
Int. Cl.[2] B65D *83/14*
U.S. Cl. 222—182 **7 Claims**

1. An aerosol dispensing device adapted for continuous dispensing until exhausted comprising:
(a) an aerosol container having a valve at its upper end actuateable by downward movement and having lateral projection means disposed about the valve;
(b) an inverted generally cup-shaped overcap normally installed on the container and having downward portions with nibs adapted for snap engagement with the projection means, and shoulder means on the inside of the overcap spaced below the top wall, the top wall of the overcap

having an opening, and an annular portion secured within the opening by break-away means to the top wall of the overcap; and

(c) actuating means adapted when the annular portion is



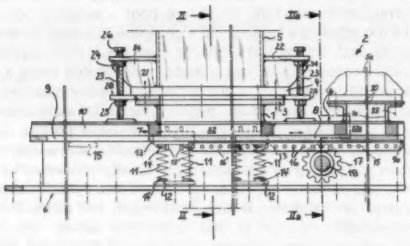
broken away from the top wall of the overcap and placed inside the overcap against the shoulder means and the overcap is reinstalled on the container, to press down the valve so that it discharges through the opening as long as the overcap remains in place.

4,186,854

GATE FOR STORAGE-TANK OUTLET

Lothar Teske, Industriestr. 30, 5000 Cologne 90, Fed. Rep. of Germany

Filed Jan. 27, 1978, Ser. No. 872,832
Int. Cl.[2] B65D *47/00*
U.S. Cl. 222—185 **8 Claims**



1. In a storage facility for bulk material, including a container body with a discharge port surrounded by a bottom flange above a base forming a channel for bulk material discharged from said port,

the combination therewith of:

a funnel supported on said base and provided with a top flange underlying said bottom flange in substantial alignment therewith, said funnel forming an outlet for said bulk material;

a sealing frame underneath said funnel rimming said outlet;

a slider having a solid portion in direct fluidtight contact with the underside of said sealing frame in a closure position, said solid portion being withdrawable from said outlet in an unloading position;

pressure means bearing upon said slider from below for maintaining said fluidtight contact;

fixed support means on said base for guiding said slider between said closure position and said unloading position;

drive means on said base for displacing said slider into either of said positions;

a spacer frame interposed between said top and bottom flanges; and

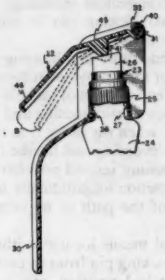
lifting means on said body for increasing the separation of said flanges to facilitate extraction of said spacer frame and replacement thereof by a substantially coextensive shutter plate.

4,186,855

SPRAY PUMP ACTUATING AND BOTTLE HOLDING DEVICE

Walter W. Edman, Westport, and Irving L. Farer, Rowayton, both of Conn., assignors to Zotos International, Inc., Darien, Conn.

Filed Jun. 19, 1978, Ser. No. 916,928
Int. Cl.[2] G01F *11/02*
U.S. Cl. 222—321 **17 Claims**



1. A pump valve actuating and bottle holding device removably mountable to a bottle having a pump-type spray valve threadedly engaged therewith, said device comprising:

(A) mounting means removably engageable with the threaded cap of the valve for secure interconnection therewith when the cap is threadedly engaged with the bottle and incorporating

(a) means forming a bottle neck portion entry and holding zone, comprising a front entry portal zone formed therein, for easy, slide-on mounting of said pump valve actuating and bottle holding device on the bottle without requiring removal of the pump spray valve threadedly engaged with the bottle, and

(b) an upturned flanged member positioned about the neck portion entry and holding zone for cooperative interengagement between the lower section of the bottle neck portion and the lower section of the threaded cap of the valve;

(B) a bottle supporting handle cooperatively associated with the mounting means; and

(C) a pump actuating lever,

(a) pivotally mounted in juxtaposed spaced relationship to the handle and the pump valve of the bottle,

(b) incorporating valve actuating means positioned for direct actuating contact of the valve, and

(c) easily movable between a first valve raised position and a second valve actuated position,

whereby simple downward movement of the lever causes the pump valve to produce a burst of product in a fine spray mist with the lever being returned to its first position through the return action of the valve.

4,186,856

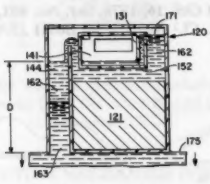
SELF-PRIMING PASSIVE DOSING DISPENSER

Robert S. Dirsking, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Aug. 14, 1978, Ser. No. 933,400
Int. Cl.[2] E03D *9/02*
U.S. Cl. 222—424.5 **11 Claims**

1. A passive dosing dispenser comprising an internal reservoir for containing a quantity of a solution, and means for causing a predetermined dose-volume of a liquid to be conducted into said reservoir so that a dose-volume of said solution is displaced from said reservoir and caused to issue from said dispenser in response to the level of a body of said liquid being lowered from a first elevation to a second elevation, said

means comprising a dose-volume measuring cavity, an inlet conduit, and a discharge standpipe, said inlet conduit having a top end in fluid communication with the interior upper reaches of said reservoir and a bottom end in fluid communication with the bottom portion of said measuring cavity, said standpipe having an upper end in fluid communication with the interior upper reaches of said reservoir and an open lower end, said reservoir being in fluid communication exclusively with said inlet conduit and said standpipe, said reservoir being adapted to hold a quantity of a solid-state product which is solvable in said liquid and for being flooded with said liquid to form said solution in said reservoir by dissolving some of said product, said dispenser further comprising means for being so disposed in said body of liquid that said measuring cavity is filled with said liquid whenever the level of said body of liquid is raised to said first elevation from said second elevation and so that said dose-volume of said liquid will be vacuum-transferred from said measuring cavity via said inlet conduit to said reservoir and said dose-volume of said solution will be displaced from said reservoir into said standpipe and thence from said dis-



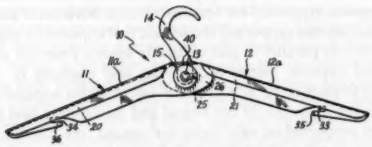
penser whenever the level of said body of liquid is lowered to said second elevation, said measuring cavity including means for making said dispenser self-priming, said means comprising a first inlet port pervious to the passage of liquid located at a sufficiently high elevation with respect to the upper end of said standpipe that said reservoir is filled by liquid entering through said standpipe when said dispenser is initially immersed in said body of liquid, said means also including a second inlet port in said measuring cavity having means for making said second inlet port impervious to the passage of liquid for a period of time sufficient for said reservoir to be filled by liquid entering through said standpipe upon immersion of said dispenser in said body of liquid, said means for making said second inlet port impervious to the passage of liquid being soluble upon sustained immersion in said liquid, said second inlet port being located at a sufficiently low elevation with respect to the upper end of said standpipe that said measuring cavity is filled through said second inlet port before the level of said body of liquid reaches the upper end of said standpipe whenever the level of said body of liquid rises from said second elevation to said first elevation.

4,186,857

COLLAPSIBLE COAT HANGER

Walter C. Helms, Jr., 1001 N. Highland St., Arlington, Va. 22210

Filed Jun. 6, 1978, Ser. No. 913,235
Int. Cl.² A47J *51/10*
U.S. Cl. 223—94 **21 Claims**



1. A collapsible coat hanger comprising:

(a) a pivot pin defining a pivot axis about which the coat hanger collapses;

(b) a first arm having a slot therein which receives said pivot pin wherein said first arm rotates about said pin and slides relative to said pin, said first arm having a projection thereon;

(c) a second arm pivotal about the axis defined by said pin to rotate toward said first arm and having an abutment thereon which is engagable by said projection on said first arm when said first and second arms are slid toward one another when the arms are substantially in the extended configuration, so as to lock said arms with respect to one another; and

(d) slot means intermediate the ends of each of said arms wherein the slot means on one arm receives a portion of the other arm to hold the arms in overlapped relationship when the hanger is collapsed; and

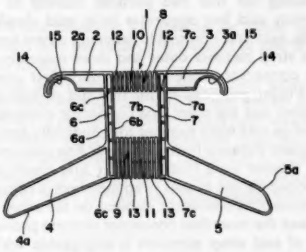
(e) hook means pivoted on said pin with said arms for extending from said arms when the arms are extended and for overlying said arms when the coat hanger is collapsed.

4,186,858

FOLDABLE HANGER

Shunji Tatematsu, 11-2, Shinnyo-cho, Jodo-ji, Sakyo-ku, Kyoto-shi, Kyotofu, Japan

Filed Dec. 26, 1978, Ser. No. 973,170
Claims priority, application Japan, Dec. 29, 1977, 52-178325[U]
Int. Cl.² A47J *51/098*
U.S. Cl. 223—94 **6 Claims**



1. A foldable hanger of one piece-construction made of synthetic resin for hanging a garment such as a coat or a suit thereon, said hanger comprising, in combination;

a substantially elongated connecting member bendable about a line substantially intermediate of the width of said connecting member;

a pair of hands extending from one end portion of the connecting member in the opposed directions with respect to each other, each of respective free ends of said hands being formed into a hook through which hanger is adapted to be engaged on an external support means, and;

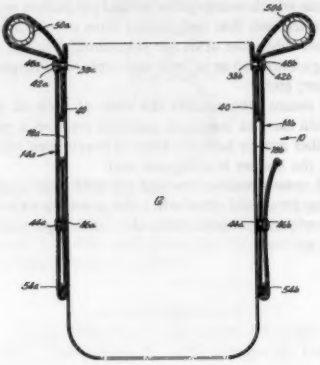
a pair of shoulders extending from the other end portion of the connecting member in the opposed directions with respect to each other for the support of the garment thereon, said hands of the pair and said shoulders of the pair being, when the hanger is folded with said connecting member bent about said line substantially intermediately of the width of the connecting portion, pivotable in a direction close towards each other.

4,186,859

CONVERTIBLE BAG APPARATUS

Roberta L. Frankfort, 165 West End Ave., New York, N.Y. 10023, and Donna L. Madonna, 120 Cabrini Blvd., New York, N.Y. 10033

Filed Jul. 31, 1978, Ser. No. 929,522
Int. Cl.[2] A45C *9/00*
U.S. Cl. 224—205 **3 Claims**



1. Bag apparatus adapted to be convertible between a shoulder carried mode and a mode wherein the bag is suspended from support members, such as handle bars of a carriage or the like, comprising:

a bag member including opposed front and rear wall portions, a pair of opposed side wall portions and a bottom wall portion;

a pair of elongate, flexible strap members, each of said strap members being affixed at one end portion thereof to a respective side wall portion of said bag member;

first means provided on said strap members for releaseably fastening the free end portions thereof to each other wherein said bag apparatus is in said shoulder carried mode, said first releaseable fastening means comprising on each strap member outer and inner mutually engageable first connector elements, said outer first connector element being provided on the free end portion of said strap member and the inner first connector element being provided on said strap member longitudinally spaced a predetermined distance from said outer first connector element in a manner such that the outer first connector element provided on one of said strap members is engageable with the inner first connector element on the other strap member and the inner first connector element provided on said one of said strap members is engageable with the outer first connector element on said other strap member;

second means provided on each of said strap members for releaseably forming a closed loop defined by a relatively short length of said strap member folded over itself in the vicinity of the respective upper edge of said bag side wall portion to which said strap member is affixed, said loop being formable about one of the support members to convert the bag to the suspended mode, said second means comprising on said length of each strap member outer and inner mutually engageable second connector elements, said outer second connector element being provided in the region of the affixed end portion of said strap member and the inner second connector element being provided on said strap member length longitudinally spaced a predetermined distance from said outer second connector element in a manner such that upon folding each of said strap member lengths over itself to form a closed loop, said outer and inner second connector elements are located in opposed relationship to each other whereby they are mutually engageable to form a closed loop;

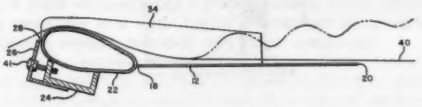
said first releaseable fastening means further further constituting means for releaseably fastening the free end portions of said strap members to respective bag side wall portions when the bag apparatus is in the suspended mode, said releaseable fastening means further including a loop member provided on each of said bag side wall portions having its ends affixed thereto, whereby upon forming said closed loop sections, said strap member free end portions are each passed through a respective loop member and folded upon itself so that the inner and outer first connector elements are located in opposed relationship to each other whereby they are mutually engaged to form a closed loop around a respective loop member so that each strap member is thereby fastened to a respective side wall portion.

4,186,860

WEB THREADING SYSTEM

Imants Reba, Vancouver, Wash., assignor to Crown Zellerbach Corporation, San Francisco, Calif.

Filed Oct. 16, 1978, Ser. No. 951,560
Int. Cl.[2] G03B *1/56*; B65H *25/06*
U.S. Cl. 226—91 **10 Claims**



1. Apparatus for directing a web of flexible material to a predetermined location comprising:

a wall element having side edges and a web entry end and a web exit end;

a Coanda nozzle located at the wall element web entry end to direct a gaseous flow therealong toward said web exit end;

venting means in operative association with said wall element and extending from said Coanda nozzle to a location between the web entry and web exit ends of said wall element for laterally venting portions of said gaseous flow past opposed side edges of the wall element whereby a web will have lateral forces exerted thereupon by said gaseous flow portions to spread and stabilize said web as the web is propelled forward by the remainder of said gaseous flow.

4,186,861

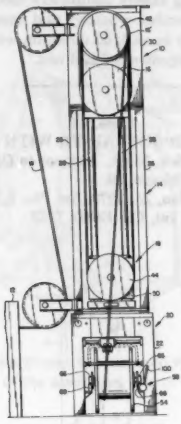
WIRE ACCUMULATOR TOWER

Wilhelm A. Steinhilber, Guilford, Conn., assignor to Orion Machinery and Engineering Corporation, Branford, Conn.

Filed Aug. 3, 1978, Ser. No. 930,698
Int. Cl.[2] B65H *17/42*
U.S. Cl. 226—118 **15 Claims**

1. In a machine for processing a continuous strand of wire the combination comprising a vertically elongated frame, a pair of capstans supported for rotation on said frame for receiving portions of the strand looped therearound and including a first capstan supported for rotation about a horizontal axis and a second capstan supported above said first capstan for rotation about an axis parallel to and vertically spaced from the axis of said first capstan, means for driving said capstans in timed relation to each other, and a festoon assembly for accumulating and storing a portion of the strand and including a first set of sheaves supported on said frame for coaxial free rotation relative to each other about an axis below and parallel to the axes of said capstans and a second set of sheaves supported on said

frame above said first set and journalled for coaxial free rotation relative to each other and to said capstans, one of said sets



being supported for vertical movement relative to said frame and toward and away from the other of said sets.

4,186,862

DEBRIS COLLECTING MECHANISM FOR PNEUMATIC DRIVING TOOLS

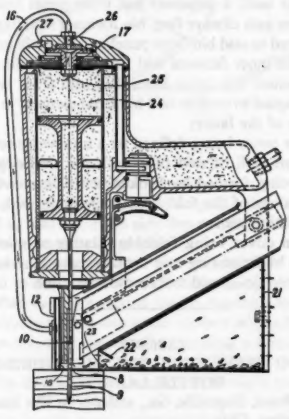
Arthur Klaus, Bad Homburg von der Hohe, Fed. Rep. of Germany, assignor to Signode Corporation, Glenview, Ill.

Filed Mar. 13, 1978, Ser. No. 885,544

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1977, 2718070

Int. Cl.² B25C *1/04*

U.S. Cl. 227—130 **9 Claims**



1. A pneumatic fastener driving tool having an outlet barrel, a magazine containing a strip of adhered fasteners and a driving plunger positioned to engage sequentially a fastener at the end of each strip for ejecting an individual fastener from the outlet barrel, a container mounted adjacent the barrel of the driving tool, which container defines an opening adjacent the barrel outlet, conduit means containing air under pressure received from the driving tool, one end of which conduit means is in communication with the end of the barrel through which a fastener moves, whereby air under pressure flows across the barrel and into the opening of the container to direct from said barrel into the container any particulate matter broken off from the fastener strip during the driving action.

4,186,863

STAPLE FASTENER APPLYING MACHINE

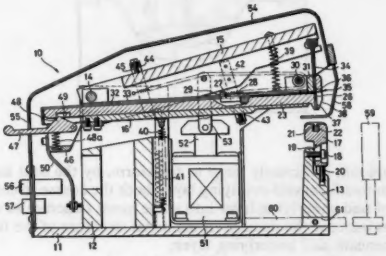
Akio Yunoki, Namerikawa, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed Mar. 10, 1978, Ser. No. 885,269

Claims priority, application Japan, Mar. 25, 1977, 52-33774

Int. Cl.² B25C *1/06*

U.S. Cl. 227—131 **8 Claims**



1. A staple fastener applying machine, comprising:

(a) a base having first and second supports mounted thereon and spaced from each other;

(b) a driver arm pivotally supported on said first support, said driver arm carrying a driver;

(c) a holder arm pivotally supported on said first support, said holder arm releaseably holding a removable magazine for storing therein a plurality of staple fasteners positioned in sequence along a path defined by said magazine;

(d) guide means provided jointly on said holder arm and said magazine, said driver being movable through said guide means;

(e) means on said magazine for feeding the staple fasteners one at a time into the path of movement of said driver in said guide means;

(f) a clinching anvil mounted on said second support and located in registry with said path of said driver; and

(g) powered drive means mounted on said base between said first and second supports and remotely from the second support, said drive means being connected to said driver arm for angularly moving said driver arm so as to enable said driver to move through said guide means toward said anvil.

4,186,864

METHOD FOR PRODUCING A WELDED JOINT

Yasuo Ishimaru; Hiroshi Kobayashi, and Junji Tamura, all of Kudamatsu, Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 14, 1977, Ser. No. 842,358

Claims priority, application Japan, Oct. 29, 1976, 51-129517; Jul. 29, 1977, 52-90352

Int. Cl.² B23K *33/00*

U.S. Cl. 228—226 **4 Claims**

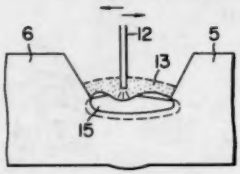
1. A method for producing a welded joint in a groove between metal components forming a weld preparation by multiple superimposed layers of deposited metal comprising the steps of:

(a) providing a base layer of deposited metal of a small thickness and a large width by producing a quantity of molten metal in said groove of the weld preparation in such a manner that that the molten metal spreads thinly and widely crosswise of the groove;

(b) providing an underlying layer of deposited metal of a small thickness and a large width by producing a quantity

of molten metal in the groove of the weld preparation in such a manner that the molten metal spreads thinly and widely crosswise of the groove upon the layer therebeneath;

(c) providing an overlying layer of deposited metal of a small thickness and a large width by producing another quantity of molten metal on the surface of said underlying layer of deposited metal in such a manner that the molten metal spreads thinly and widely crosswise of the groove, said another quantity of molten metal having heat of an



amount sufficiently large to transform, by the heat transmitted from said overlying layer, both the coarse structure of said underlying layer into a fine metal structure as well as increase the fineness of the metal structure of the layer beneath said underlying layer;

(d) repeating the steps of (b) and (c); and

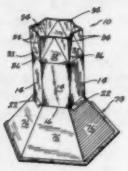
wherein the layers of deposited metal are produced with a shape such that the layers have a smaller thickness at end portions thereof adjacent the metal components as viewed widthwise of the groove of the weld preparation than at their central portion.

4,186,865

MEANS FOR SECURING THE BOTTOM CLOSURE OF A POLYGONAL CONTAINER

Tim McConnel, Omaha, Nebr., assignor to International Drum Corporation, Des Moines, Iowa

Filed Jun. 13, 1978, Ser. No. 915,015
Int. Cl.[2] B65D *5/12, 5/36*
U.S. Cl. 229—5.7 **4 Claims**



1. A clip for securing the bottom wall of a polygonal container, said container having a plurality of side panels and a strong, weight supporting bottom comprising a plurality of generally triangular bottom panels equal in number to the side panels and a plurality of interconnecting webs each extending between a pair of adjacent bottom panels and being folded into a reinforcing rib, each bottom panel being hingedly connected to one of the side panels and being inclined upwardly from the bottom edge of the side panel to which it is connected so as to form an acute angle therewith, said reinforcing ribs being arranged with respect to one another in spoke-like fashion with each rib having one end adjacent a center location and said ribs extending radially outwardly therefrom, said clip comprising:

an annular member having a central hub portion and a plurality of fingers extending radially outwardly from said hub, said fingers being circumferentially spaced to provide therebetween a plurality of radially extending slots;

said annular member being positioned with said hub adjacent said center location and with said one ends of said ribs extending within said slots of said annular member,

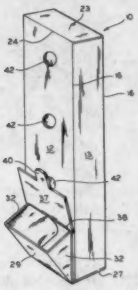
said ribs extending axially completely through said slots of said annular member whereby said annular member can slide frictionally in an axial direction with respect to said spoke-like arrangement of said ribs.

4,186,866

DISPENSER CONTAINER WITH COVER

James A. Zicko, Natick, Mass., assignor to Container Corporation of America, Chicago, Ill.

Filed Jan. 25, 1979, Ser. No. 6,560
Int. Cl.[2] B65D *5/72*
U.S. Cl. 229—17 B **1 Claim**



1. A dispenser container formed from a cut and scored blank of paperboard or the like, comprising:

(a) front, rear and side walls hingedly interconnected along parallel fold lines and defining a tube;

(b) flap elements forming a closure for one end of said tube;

(c) a dispenser bin structure at the other end of said tube comprising an outer closure flap foldably connected to said rear wall, a dispenser bin front panel foldably connected to said closure flap, bin forming side flaps foldably connected to said bin front panel and foldable into position along the inner faces of said side walls of said tube;

(d) a dispenser bin cover formed in said front wall of said tube adapted to overlie said bin front element in the closed position of the latter;

(e) said bin cover being defined by a transverse score line in said front wall of said tube with the side edges of said cover being formed by broken score lines which are a continuation of the fold lines connecting said front wall and said side walls;

(f) said bin cover being foldable relative to said front bin element by fracturing said broken score lines and folding said cover along said transverse score line.

4,186,867

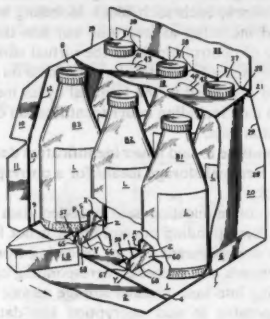
MEANS FOR PREVENTING THE DISFIGUREMENT OF BOTTLE LABELS

Prentice J. Wood, Hapeville, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Aug. 14, 1978, Ser. No. 933,488
Int. Cl.[2] B65D *75/72, 1/22*
U.S. Cl. 229—40 **6 Claims**

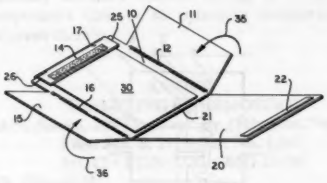
1. In a preformed sleeve type bottle carrier arranged for loading at least two bottles having labels through an open side wall of the sleeve and including a bottom wall (1) with two bottles disposed thereon, a label saving tab (57–64) struck from said bottom wall and being joined thereto along a transverse fold line (65–72) disposed perpendicular to the side wall and interposed between said two bottles, and characterized in that

said label saving tab has a cutaway portion disposed in the upper outer corner of said tab, and said cutaway portion is



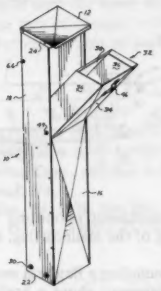
defined by a primary edge (P) disposed below the lowermost part of the label of the associated one of said bottles.

4,186,868
SPECIALTY ENVELOPE
John D. Coleman, 26 A Great Woods Ct., Fairport, N.Y. 14450
Filed May 1, 1978, Ser. No. 901,502
Int. Cl.[2] B65D *27/14*
U.S. Cl. 229—92.1 **2 Claims**



1. An envelope assembly comprising
a writing surface having a first length, a right side flap disposed so that said right side flap may be folded to cover a portion of said writing surface;
a left side flap disposed so that said left side flap may be folded to cover a portion of said writing surface;
a front flap having a second length, having a lower surface, and having a front flap upper surface with a first adhesive means disposed thereon for fastening a foreign object to said front flap;
a rear flap having a third length and having a rear flap upper surface;
said third length being substantially the same as said first length;
said rear flap being disposed so that it may be folded to cover a portion of said writing surface;
second adhesive means disposed on said front flap lower surface for attaching said rear flap upper surface to said lower surface when said rear flap is folded over said writing surface subsequent to said front flap being folded over said writing surface; and
wherein the sum of second second length and said third length is greater than said first length.

4,186,869
MAIL BOX
Charles E. Brown, P.O. Box 1875, Hereford, Tex. 79045
Filed May 11, 1978, Ser. No. 904,903
Int. Cl.[2] A47G *29/12*
U.S. Cl. 232—17 **16 Claims**

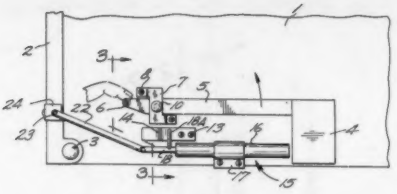


1. A mail box comprising:
a. a housing having the shape of a rectangular prism,
b. said housing having
(i) a cap,
(ii) a back,
(iii) a front,
(iv) a blank side, and
(v) a flag side,
c. the back and each of the sides being rectangular and extending from the bottom to the top of the housing,
d. the back rigidly attached to the two sides,
e. the cap rigidly attached to the back and two sides with
f. a cap lip enclosing the back and two sides,
g. the front extending from the bottom to past halfway to the top, and rigidly attached to the two sides,
h. anchor means on the bottom of the housing for attaching the housing to supporting structure,
j. a letter box having at least the following elements rigidly attached together,
(i) a front, and
(ii) two sides,
k. the letter box pivoted to the housing near the bottom and front of the letter box sides,
m. the letter box front filling the housing from the housing front to the cap,
n. a false bottom rigidly attached to the back, sides, and front of the housing below the letter box,
o. the cap having an overhang over the letter box front, and
p. a flag pivoted to the flag side,
q. said letter box having a back rigidly connected to the letter box sides,
r. a flag rod to which the flag is rigidly attached,
s. said flag rod pivoted through the flag side and blank side,
t. said flag rod having a radial extension thereon in the same plane with the flag,
u. said flag rod being below the top of the back of the letter box,
v. so that the back of the letter box contacts said radial extension when the box is closed thereby holding the flag in a full up position or a full down position when the letter box is closed, and
w. said flag being free to rotate by gravity when the letter box is pivoted open.

4,186,870
MAILBOX ATTACHMENT

Frank B. Walden, Space 38 2395 Redwood Ave., Grants Pass, Oreg. 97526

Filed Jul. 5, 1978, Ser. No. 921,966
Int. Cl.[2] A47G 29/12
U.S. Cl. 232—35 1 Claim



1. A mailbox attachment permitting fingertip raising and automatic lowering of the mailbox flag, said attachment comprising,

a flag assembly including a flag arm mounted to the mailbox for pivotal movement about a horizontal axis, said flag arm having a horizontally extending projection at its lower end to receive fingertip pressure for raising of the flag arm,

a friction lock secured to said mailbox and having a bowed flexible segment disposed for friction contact with the lower end of the flag arm when the flag arm is in a raised position,

biased means including a housing attached to the lower side edge of the mailbox, a spring within said housing, a rod having one end within said housing and acted upon by said spring for rod retraction, said rod including an upright arm also contactable with said horizontal projection on the flag arm for imparting lowering pivotal movement to the arm during rod extension,

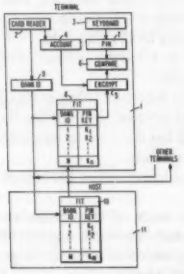
a clip mounted to the mailbox door, and

a link pivotally connected to said clip and to the exposed end of said rod whereby said rod is extracted by door opening movement to cause the arm on said rod to contact said flag arm extension and impart lowering movement to said arm.

4,186,871
TRANSACTION EXECUTION SYSTEM WITH SECURE ENCRYPTION KEY STORAGE AND COMMUNICATIONS

Robert W. Anderson, Morgan Hill; Steven F. Brock, and May L. Gee, both of San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 1, 1978, Ser. No. 882,529
Int. Cl.[2] G06K 5/00; H04Q 3/54
U.S. Cl. 235—380 18 Claims



1. A transaction terminal connectable to a host having a virtual storage means with a plurality of issuer unique control blocks, the transaction terminal comprising:

terminal storage means for storing at least one issuer unique control block, each such block including an encryption key, and including at least one but less than all of the plurality of control blocks in the virtual storage means;

card reader means for reading encoded data on an identification card presented to the terminal by an individual, said encoded data including issuer identification data and card verification data;

means responsive to said issuer identification data for searching said terminal storage means for a corresponding control block;

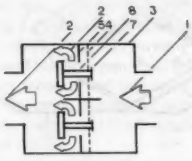
means for communicating said encoded data to the host when a corresponding control block is not found in said terminal storage means and for receiving from the virtual storage means at the host a corresponding control block for writing into said terminal storage means; and

means responsive to said encryption key data from said corresponding control block for encrypting said card verification data to generate a card check number.

4,186,872
ALTERNATE PATH COOLING SYSTEM FOR LIQUID COOLED DEVICES SUCH AS ENGINES

William M. Bland, Jr., 18575 Martinique Dr., Nassau Bay, Tex. 77058, and Edison M. Fields, 5314 Valkeith, Houston, Tex. 77096

Filed Apr. 22, 1976, Ser. No. 679,150
Int. Cl.[2] F01P 7/02
U.S. Cl. 236—34.5 2 Claims



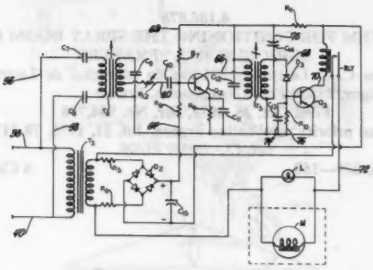
1. A coolant temperature-control assembly outer housing, said housing being connected at one of its ends to a heat producing device and connected at its other end to a liquid coolant radiator, said housing being divided internally into two coolant flow passages with both passages being the same size and with each passage being capable of providing the full coolant flow rate required by the heat producing device, and each said passage having a valve attached internally by suitable means to the housing for the purpose of controlling the flow of coolant independently through each passage between the heat producing device and the said liquid coolant radiator, with each passage so proportioned that either of said passages can provide the required full coolant flow through all phases of heat producing device operation with the other passage failed closed, without interruption of heat producing device operation, or any damage, repair, adjustment, or maintenance to the heat producing device, or knowledge of the occurrence of the failure by the operator of the heat producing device, with said valves being thermostat valves of conventional construction and alike in all respects and each containing a movable part that is caused to open and close in response to the temperature of the coolant surrounding the valve, with both valves opening at the same preset temperature.

4,186,873

HUMIDITY CONTROL SYSTEM AND CIRCUITRY

Russell W. Geisler, 31100 Hunters Dr., Farmington Hills, Mich. 48018, and Walter H. Geisler, New Orleans, La., assignors to Russel W. Geisler and Joseph C. Pansing, both of Farmington Hills, Mich.

Filed Apr. 25, 1978, Ser. No. 899,802
Int. Cl.[2] B01F *3/02*; G05D *21/00*
U.S. Cl. 236—44 A **4 Claims**



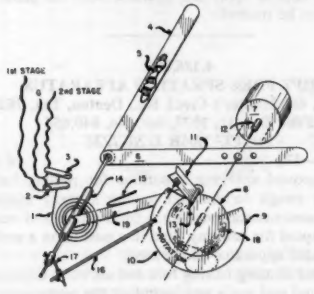
1. A humidity control system and circuitry, comprising:
a carrier current transmitter and receiver in combination and for use within a conventional electrical wiring system for a building,
said transmitter including a step-down transformer and a humidity sensing switching device compactly housed together,
and said humidity sensing device being provided within the power supply line for said transformer to provide only intermittent actuation thereof for improved sensitivity to humidity demands without having to compensate for temperature rises in an operating transformer closely adjacent thereto.

4,186,874

TARGETING THERMOSTAT

Ronald N. Jensen, 208 Greenwell Dr., Hampton, Va. 23666

Filed Jan. 5, 1979, Ser. No. 1,063
Int. Cl.[2] F23N *5/20*; G05D *23/00*
U.S. Cl. 236—46 R **9 Claims**



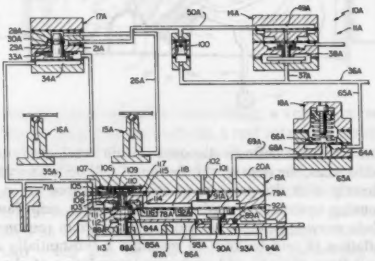
1. A thermostatic control that operates a heating system to regulate temperature to a prescribed schedule, comprising
a switch or switches operated from a temperature sensitive element which operates a heating system depending on the difference between the space temperature and the scheduled space temperature setting,
and a device which modifys the space temperature setting of the control by adjustment of the said temperature sensitive element through a temperature adjustment arm,
and a timer driven cam that repositions the said temperature adjustment arm in a prescribed manor,
and an outside sensor that repositions a rider lever in respect to the ambient temperature,
and a secondary cam rider pivoted on the said temperature adjustment arm which is positioned by the said outside temperature sensor's rider lever and operating so that the cam rider interacts with the timer driven cam,
and which varies the rate of change to the set point control during the heating system's warm up period in respect to the outside temperature.

4,186,875

TWO-TEMPERATURE PNEUMATIC THERMOSTAT CONTROL SYSTEM AND UNIT THEREFOR

Jay L. Lewis, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Mar. 20, 1978, Ser. No. 888,500
Int. Cl.[2] G05D *23/00*
U.S. Cl. 236—47 **10 Claims**



1. In a two-temperature pneumatic thermostat control system having an output device, a two level source of pneumatic pressure, a first temperature sensor for controlling the flow of pneumatic fluid from said source to said device when said source is at a first level thereof, a second temperature sensor for controlling the flow of pneumatic fluid from said source to said device when said source is at a second level thereof, a switching means for automatically switching said device to be controlled by said first sensor when said source is at said first level thereof and by said second sensor when said source is at said second level thereof, and manual reset means for causing said switching means to switch said device to be controlled by said first sensor even though said source is at said second level thereof when said reset means is moved to a reset position thereof, said reset means including a pivotally mounted lever having pneumatic means for acting on one end thereof and valve means at the other end thereof to be controlled thereby, the improvement wherein said valve means comprises a close-before-open valve means operatively interconnected to said inlet means and said switching means to be controlled by said other end of said lever of said reset means to cause said switching means to switch said device to be controlled by said first sensor even though said source is at said second level thereof when said reset means is moved to said reset position thereof.

4,186,876

SYSTEM POWERED DAMPER BLADE ASSEMBLY FOR USE IN AN AIR CONDITIONING SYSTEM

William E. Clark, Syracuse; Carl C. Herb, Camillus, and Reginald S. Greene, Rochester, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 7, 1977, Ser. No. 858,140
Int. Cl.[2] F24F *7/00*
U.S. Cl. 236—49 **2 Claims**

1. An air conditioning system including a conditioned air

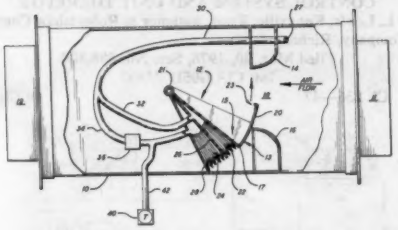
supply duct for delivering conditioned air to an enclosure comprising:

a damper assembly for modulating the flow of conditioned air including a housing positioned within the air flow path through said duct and having a damper blade pivotally mounted therewithin;

at least one cutoff plate mounted in said housing with said damper blade and cutoff plate defining therebetween a flow path for said conditioned air;

a first plate pivotally mounted within said housing about the same center of rotation as said damper blade and being spaced therefrom for defining a first space;

a second plate mounted within said housing in a predetermined position spaced from said first plate for defining a second space, said first plate being located between said damper blade and said second plate;



a first inflatable bellows disposed within a selected one of said spaces, the degree of inflation of said bellows varying directly with the pressure of said conditioned air in said housing upstream of said damper assembly, said damper blade moving relative to said second plate in response to inflation of said bellows to maintain a substantially constant flow of air to said enclosure irrespective of changes in said conditioned air supply pressure; and

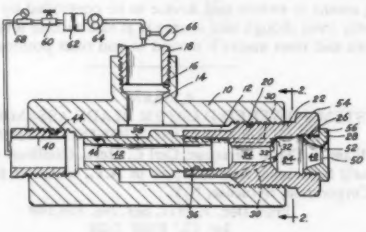
temperature override means including second inflatable bellows disposed within the other of said spaces and connected to said damper blade to move said blade relative to said second plate, the degree of inflation of said second bellows varying inversely with the difference between sensed air temperature of said enclosure and a predetermined set point temperature, with the damper blade being moved thereby to reduce the flow of air below said substantially constant level as the temperature of the air in said enclosure approaches said predetermined set point.

4,186,877

BY-PASS NOZZLES

Richard L. Wilcox, Adel, and Sherman E. Conrad, Des Moines, both of Iowa, assignors to Delavan Manufacturing Company, West Des Moines, Iowa

Filed Jun. 25, 1976, Ser. No. 699,858
Int. Cl.[2] B05B 9/00
U.S. Cl. 239—124 **8 Claims**



1. In a fluid by-pass nozzle having a chamber, inlet orifice means for introducing fluid to said chamber, discharge orifice means for discharging fluid from said chamber, and by-pass means for selectively removing a predetermined portion of the fluid introduced by said inlet orifice means to said chamber to regulate the quantity of fluid discharged from said discharge orifice means, the improvement comprising:

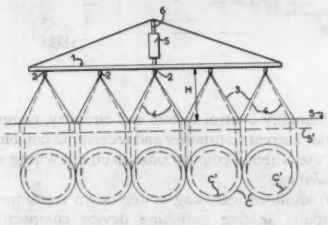
the ratio of the total cross-sectional area of said inlet orifice means to the cross-sectional area of said discharge orifice means is less than 1.50.

4,186,878

SYSTEM FOR POSITIONING THE SPRAY BOOM OF AGRICULTURAL SPRAYERS

Maurice C. J. Lestradet, 291 rue du Maréchal de Lattre de Tassigny, 51230 Fere Champenoise, France

Filed Oct. 26, 1978, Ser. No. 954,778
Claims priority, application France, Jul. 21, 1978, 78 21717
Int. Cl.[2] B05B 15/08
U.S. Cl. 239—160 **6 Claims**



1. Device for the automatic regulation of the height with respect to the plane of the surface to be treated, of a boom (1) equipped with conical jet spraying nozzles of a sprayer, particularly an agricultural sprayer, in accordance with the pressure in the boom of the fluid to be sprayed, characterized in that it comprises a system for the translatory displacement of the boom perpendicularly to the plane of the surface to be treated, mounted on the chassis of the sprayer, means (7 to 9) for detecting the position of the boom in respect to the said chassis, means (12) for comparing the signals coming from the detection means with a value representing the said fluid pressure in the boom, and means connected to the comparison means for operating the said displacement system in one direction or the other in accordance with the differences detected, for the purpose of keeping substantially tangent the circles or ellipses at which the conical spray jets intersect with the plane of the said surface to be treated.

4,186,879

DRIFT FREE SPRAYING APPARATUS

Leon Kinder, 400 Hunter's Creek Rd., Denton, Tex. 76201

Filed Oct. 11, 1977, Ser. No. 840,656
Int. Cl.[2] B05B 1/20, 1/28
U.S. Cl. 239—172 **6 Claims**

1. An improved spraying apparatus for pulling behind a vehicle over rough terrain and having a spray mechanism mounted in communication with a fluid pump and reservoir assembly adapted for emitting fluid in a mist upon a surface to be sprayed, said apparatus comprising:

an elongated housing having fore and aft walls adjacent first and second end walls and including the spray mechanism mounted therein for confined spraying;

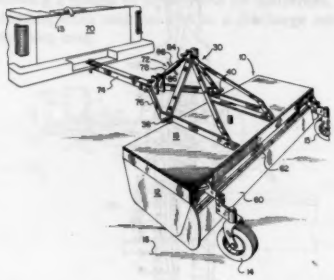
said housing having a top wall interconnecting said fore, aft and end walls and opposite an open lower portion opening toward the surface to be sprayed;

said fore and aft walls each including an elongated section attached to said fore and aft walls and suitable for passing in close proximity to non-planar areas of the surface for confining spray within said housing;

said first and second end walls depending from said top wall for rigidly supporting said housing upon the surface to be sprayed during travel thereover and confining the sprayed mist therebetween and between said fore and aft walls;

said housing including at least one wheel for engaging the surface to be sprayed, said wheel being disposed to the rear and outwardly of said aft wall in rearward support of said housing, wherein said housing is adapted to be coupled to said vehicle in towable interconnection through a yoke assembly secured thereto;

said yoke assembly comprising a tongue having means for coupling to said vehicle on one end and a split yoke secured from the other end, said split yoke being attached to said spraying apparatus for towable engagement therewith, and having an adjustment linkage upstanding thereon for determining the angular orientation of said spraying apparatus relative to the surface to be sprayed.

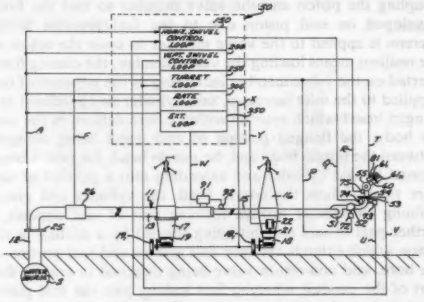


4,186,880

PROGRAM CONTROL FOR CENTER POST IRRIGATION SYSTEM

Edgar F. Jacobi, Huntington Beach, Calif., and Mark R. Madden, Plainsfield, Wis., assignors to Colkhi, Inc., San Diego, Calif.

Filed Oct. 13, 1978, Ser. No. 950,991
Int. Cl.² B05B *3/12*
U.S. Cl. 239—177 **4 Claims**



1. In a center post irrigation system including a telescoping extension supported on a steerable carriage for pivotal translation, the improvement comprising:

angular measuring means attached to said irrigation system for providing an angular signal indicative of the pivotal advance thereof;

angular rate control means connected to said irrigation system and adapted to receive said angular signal for controlling the angular rate of said system in response thereto;

a rotatable turret mounted on the end of said telescopic extension including a plurality of radially disposed nozzles each selectively aligned with said end; and

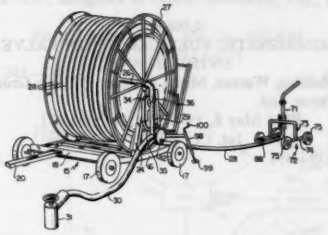
pressure control means mounted in said extension for regulating the pressure of liquids propagated therethrough in response to said angular signal.

4,186,881

IRRIGATION MACHINE

William R. Long, Tarboro, N.C., assignor to Long Mfg. N. C., Inc., Tarboro, N.C.

Filed Nov. 9, 1978, Ser. No. 959,284
Int. Cl.² A01G *25/09*; B05B *3/18*
U.S. Cl. 239—198 **12 Claims**



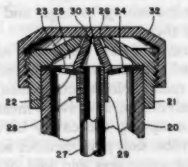
1. An irrigation apparatus comprising, a vehicle, a reel support frame carried by said vehicle, a reel rotatably mounted on said reel support frame and in spaced relationship to the earth, an elongated flexible hose carried by said reel, means for supplying water under pressure to one end of said hose, the opposite end of said hose being connected to a water gun movably mounted on a travelling carriage, parallelogram means mounting said water gun on said carriage and permitting limited movement of said water gun along a generally vertical plane, means urging said water gun toward an upper position, and means for rotating said reel in one direction to cause said hose to be wound thereon and move said travelling carriage toward said vehicle, whereby the weight of said hose and the water carried thereby normally maintain said water gun in a lowered position until said carriage is located near said vehicle and said reel supports the weight of said hose which permits said urging means to raise said water gun.

4,186,882

ATOMIZING LIQUID DISPENSER

Harry Szczepanski, 755 Oakleigh Rd., NW., Grand Rapids, Mich. 49504

Filed Dec. 8, 1977, Ser. No. 858,849
Int. Cl.² B05B *11/04*
U.S. Cl. 239—327 **1 Claim**



1. An atomizing liquid dispenser including a manually deformable container having an opening, and a closure member for said opening provided with a discharge orifice, and also including a liquid-dispensing nozzle operative to discharge liquid via a liquid outlet through said orifice, and a cap extending over said orifice and the end of said nozzle, said orifice and

nozzle defining between them an air passage communicating with said container, wherein the improvement comprises:

a transverse perforate plate supporting said nozzle,

(a) said plate being interposed between said container and said closure member,

(b) said nozzle having a portion containing said outlet normally projecting outwardly beyond said closure member,

(c) said cap and closure member being in threaded engagement, and

(d) said plate being resilient as a diaphram to a degree such that manually tightening said cap induces at least partial retraction of said nozzle within said orifice, and resilient closure of said outlet and subsequent closure of said orifice around said outlet.

4,186,883

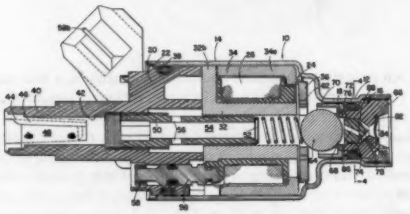
ELECTROMAGNETIC FUEL INJECTION VALVE WITH SWIRL MEANS

Marc E. Robling, Warren, Mich., assignor to Essex Group, Inc., Fort Wayne, Ind.

Filed May 8, 1978, Ser. No. 904,077

Int. Cl.[2] B05B 1/34

U.S. Cl. 239—491 **1 Claim**



1. An electromagnetic fuel injection valve, comprising:

a tubular housing including inlet means and outlet means axially aligned at opposite ends of said housing;

an electromagnetic actuator situated axially within said housing including a spool-shaped bobbin, an electromagnetic coil wound upon said bobbin, and a frame assembly comprising inner and outer frame pieces arranged to form a pole piece at the outlet end of said actuator;

a washer-shaped electromagnetic armature situated axially between said pole piece and said outlet and arranged to be axially attracted to said pole piece, said pole piece and said armature being of such configuration so that there is substantially no magnetic force of attraction between them other than at right angles to the face of said armature;

a valve seat downstream from said electromagnetic armature;

a spherically-shaped valve member attached to said armature and arranged to cooperate with said valve seat to control flow of fuel therethrough;

spring biasing means acting to urge said spherical valve member toward the closed position;

an orifice downstream of said valve seat; and

swirl means located between said valve seat and said orifice for imparting a radial velocity component to fuel flowing through said valve seat, said swirl means comprising a plug member occupying the cavity between said valve seat and said orifice, said plug member separting the cavity between said valve seat and said orifice into an entrance cavity at the outlet of the valve seat and an exit cavity adjacent to said outlet orifice, said exit cavity being defined by a conical extension of said plug member and a corresponding conically shaped wall on said housing, passageways in said plug member inclined at angle with respect to the valve axis for imparting a radial velocity to fuel flowing from the valve.

4,186,884

LIQUID FUEL INJECTION NOZZLES

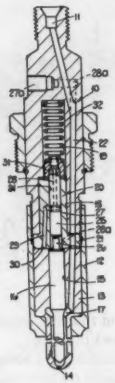
Dorian F. Mowbray, Burnham, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Dec. 13, 1978, Ser. No. 968,929

Claims priority, application United Kingdom, Jan. 11, 1978, 991/78

Int. Cl.[2] F02M 47/02

U.S. Cl. 239—533.8 **4 Claims**



1. A liquid fuel injection nozzle for an internal combustion engine comprising a nozzle body and a nozzle head adapted to be connected together, a fluid pressure operable resiliently loaded valve member for controlling the flow of fuel through an outlet orifice from an inlet, the inlet in use, being connected to a fuel pump actuated by the engine, the fuel pressure at the inlet acting on a surface defined on the valve member to lift the valve member and thereby to permit fuel flow through the outlet orifice, a cylinder, a piston slidable in said cylinder and having a smaller cross-sectional area than said surface of the valve member, a conduit through which in use fuel can be supplied to one end of said cylinder at a pressure substantially the same as the pressure of fuel supplied to said inlet, a non-return valve in said conduit and acting to prevent flow of fuel out of said end of said cylinder through the conduit and means coupling the piston and the valve member so that the force developed on said piston due to the fuel pressure acting thereon is applied to the valve member to assist the action of the resilient means loading the valve member, the closing force exerted on the valve member increasing as the pressure of fuel supplied to the inlet increases, said cylinder being defined in a flanged insert which extends within a bore defined in the nozzle body, the flanged portion of said insert being clamped between the nozzle body and the nozzle head, the piston being located in said cylinder and extending into a portion of said bore remote from the nozzle head, the cylinder and piston defining an annular groove forming part of said conduit, a further part of said conduit being formed by a drilling in the piston which extends between said groove and said portion of the bore, said non-return valve being disposed in said further part of the conduit whereby fuel leaking past the said piston from said portion of the bore is collected in said groove and returned to said inlet.

4,186,885

TRUCK MOUNTABLE ROADSIDE SPRAY DEVICE

Paul T. Christian, 528 E. Astor, Colville, Wash. 99114

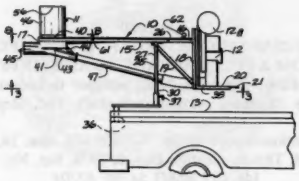
Filed Jun. 12, 1978, Ser. No. 914,533

Int. Cl.[2] A01C 15/04, 23/00

U.S. Cl. 239—654 **9 Claims**

1. A spray apparatus for broadcasting solid particles, such as seeds or fertilizer, comprising:

an upright storage hopper;
particle discharge means at the lower end of the hopper for dispensing an even flow of particles from within the hopper;
a radial vaned broadcast disk mounted beneath said particle discharge means for rotation about a central upright disk axis;
a blower;
a duct having one end operably connected to the blower for receiving a stream of pressurized air therefrom, said duct extending from said one end to a discharge nozzle at its remaining end;



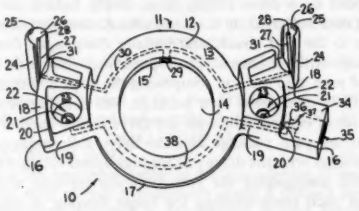
said duct being bifurcated with a first branch thereof forming a main airstream;
and pneumatic drive means operably connected to said disk, comprising:
a second branch of the duct leading to the disk for directing forced air against the disk vanes for rotating the disk about its axis to move particles which fall onto the disk from within the hopper;
a manifold openly communicating with both branches of the duct for receiving particles from the disk and pressurized air from the blower and for mixing the air and particles to form the spray.

4,186,886

ADAPTING MEANS PROVIDING DETACHABLE MOUNTING OF AN INDUCTION-CHARGING ADAPTER HEAD ON A SPRAY DEVICE

James E. Sickles, Glenshaw, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 4, 1978, Ser. No. 931,062
Int. Cl.² B05B 5/02
U.S. Cl. 239—691 **10 Claims**



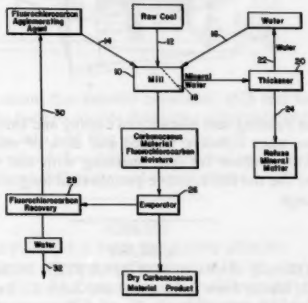
1. Adapting means for providing detachable mounting of an electrostatic induction charging adapter head onto a spray device, the adapter head comprising a housing fabricated of dielectric material, the housing having attached thereto at least one induction charging electrode and high voltage contact means connected to the induction charging electrode, the spray including a spray-forming nozzle having an axis generally parallel with the axis of a stream of spray particles formed by the nozzle, said adapter means comprising:
(a) a plate-like frame comprised of dielectric material;
(b) first securing means included on said plate-like frame for detachably securing said induction charging adapter head onto said frame, so that said induction charging electrode of the adapter head is disposed outwardly of a spray-forming nozzle, when said frame is mounted on said spray device and when the induction charging adapter head is detachably mounted on said frame; and
(c) first high voltage contact means on said plate-like frame for making a detachable electrical connection to high voltage contact means on the induction charging adapter head.

4,186,887

PROCESSES FOR RECOVERING COAL

Douglas V. Keller, Jr., LaFayette, and Andrew Rainis, Syracuse, both of N.Y., assignors to Otisca Industries, Ltd., Syracuse, N.Y.

Filed Aug. 15, 1978, Ser. No. 933,845
Int. Cl.² B02C 23/18
U.S. Cl. 241—20 **12 Claims**



1. A process for dissociating coal from a composite in which mineral matter is associated therewith and recovering said coal in agglomerated form, said process comprising the steps of: forming an aqueous slurry containing said composite and a fluorochlorocarbon with respect to which said coal is hydrophobic; milling said composite until the composite has been resolved into particles of mineral matter and particles of coal and the latter have been coalesced into agglomerates of product coal; and recovering the agglomerates from the slurry.

4,186,888

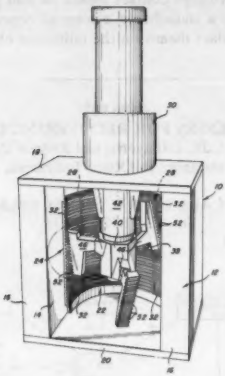
COMMINUTOR FOR SEWAGE FLOWING IN LIQUIDS

William B. Galanty, 1 Argyle Ct., Livingston, N.J. 07039

Filed Sep. 18, 1978, Ser. No. 927,492
Int. Cl.² B02C 23/30
U.S. Cl. 241—46.06 **6 Claims**

1. An improved comminutor for a sewage channel comprising a semi-cylindrical cage member forming a concave surface traversely disposed in said sewage channel along a flow path of said channel, said cage having a plurality of slotted openings cutting said cage member in planes perpendicular to an axis thereof and said slotted openings forming a plurality of spaced apart arcuate bar-like elements extending along the full concave length of said cage and extending along the axial dimension of the concave surface of said cage; a plurality of removably fixed comb-tooth cutting and shredding members having a plurality of spaced apart teeth formed along an inner surface thereof, said cutting and shredding members being disposed parallel to the axis of said cage having said inner surface teeth extending radially toward said axis in alignment along the axis of said cage with a corresponding plurality of spaced apart bar-like surfaces of said cage and said cutting and shredding teeth extend radially toward the axis of said cage a distance greater than that of said bar-like surfaces of said cage; and a plurality of cutting and shredding arms mounted for rotation

about the axis of said cage member and located on the upstream side of said concave surface of said cage and having a plurality of teeth on each of said arms for interengaging said teeth of said fixed comb-tooth member and extending into said slotted opening of the bar-like surface of said cage and driving



means for rotating said plurality of cutting and shredding arms along the inner concave surface and slots of said cage and comb-tooth member for inter meshing with said slots of the cage over the the full concave peripherical length of said slots of said cage.

4,186,889

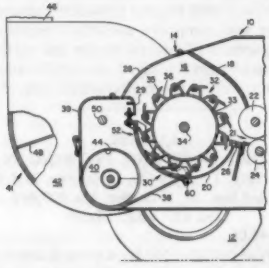
FORAGE HARVESTER RECUTTER SCREEN

Robert D. Black; John J. Hennen, and Jerry L. Krafka, all of Ottumwa, Iowa, assignors to Deere & Company, Moline, Ill.

Filed May 18, 1978, Ser. No. 907,126

Int. Cl.[2] B02C *18/22*

U.S. Cl. 241—89.2 **7 Claims**



1. In a forage harvester comprising (a) a mobile frame, (b) a cutterhead housing mounted on the frame and having a crop inlet opening and a discharge opening, (c) a rotary cutterhead mounted in the housing and having a plurality of knives with cutting edges at the cutterhead periphery, the knife cutting edges generating a cylinder as the cutterhead rotates, said cutterhead engaging and reducing crop material that moves through the housing inlet opening and impelling said material through the discharge opening, (d) an arcuate recutter screen in the form of a section of a cylinder, the screen including a plurality of elongated apertures, each aperture having a longitudinal edge extending diagonally relative to the cutting edges of the cutterhead knives and the cutterhead axis; and (e) means removably mounting the recutter screen over the discharge opening adjacent the cutterhead periphery and generally coaxial with the cutterhead, the improvement comprising the apertures arranged in at least two transversely extending rows, said aperture edges in one row being substantially mutually parallel and canted relative to the knife cutting edges to form an angle of less than 90° measured from the knife edge to the aperture edge in a first clock direction, said aperture edges in a second row adjacent said one row canted relative to the knife edges to form an angle of less than 90° measured from the knife edge to the aperture edge in a second clock direction opposite from the first direction.

4,186,890

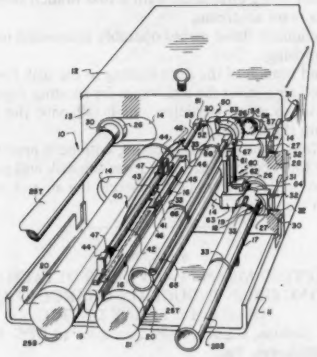
MECHANISM AND METHOD FOR TRANSFERRING YARN FROM A FULL PACKAGE TO AN EMPTY BOBBIN

Harry B. Miller, Charlotte, N.C., assignor to Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 809,676, Jun. 24, 1977, abandoned. This application Dec. 5, 1978, Ser. No. 966,670

Int. Cl.[2] B65H *54/06, 67/04*

U.S. Cl. 242—18 A **10 Claims**



1. A method of transferring a yarn or the like, being cross-wound by traverse means into a yarn package, on a substantially full bobbin mounted on a first chuck, and rotated at a high speed by a drive roller, to an empty bobbin having a starting end, mounted on a second chuck arranged in spaced relation to the first chuck, and initially disengaged from the drive roll, without loss of yarn speed and with little or no waste of yarn, said method comprising the steps of moving the substantially completed yarn package, still rotating at a high speed, out of engagement with the drive roll to leave a space between the yarn package and the drive roll; engaging the empty bobbin with the drive roll for high speed rotation by the drive roll; disengaging the yarn from the traverse means to interrupt such cross-winding for linear feeding of the yarn across such space to the yarn package still rotating at high speed; guiding the disengaged yarn into alignment with the starting end of the empty bobbin; providing an elongated element extending, substantially parallel to the chucks, throughout substantially the full length of the chucks; swinging such elongated element about the axis of the first chuck to engage the yarn traversing said space and move the yarn into engagement with the starting end of the empty bobbin, now rotated at a high speed by the drive roll, for catching and severing of the yarn being fed to the completed yarn package and winding of the yarn on the empty bobbin; and re-engaging the yarn in the traverse means for cross-winding a new yarn package on the previously empty bobbin.

4,186,891

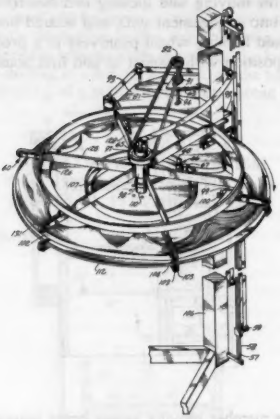
ENDLESS TAPE WINDING DEVICE

Joseph R. Johnson, La Place, La., assignor to Electro Mag Sales, La Place, La.

Continuation-in-part of Ser. No. 736,277, Oct. 27, 1976, Pat. No. 4,066,221. This application Oct. 21, 1977, Ser. No. 844,469

Int. Cl.[2] B65H *17/48*

U.S. Cl. 242—55.19 R **7 Claims**



2. A tape-handling apparatus comprising:

a turntable rotatable about an axis;

means for holding a tape wound on the turntable on edge against the turntable along a plurality of radii of the turntable and permitting movement of the tape radially along each of the plurality of radii while preventing circumferential movement of the tape across each of the plurality of radii, the holding means comprising at least one radially extending rotatable continuous-loop belt on each side of the tape at each radius and cooperating to prevent circumferential movement across the radius while permitting radial movement;

means for mounting the belts remote from the surface of the turntable for rotation about the axis of the turntable; and

means for rotating the turntable and the mounting means in synchronism.

4,186,892

NON-SEIZING CLOSED LOOP FILM TRANSPORT SYSTEM

Gerald C. Woythal, Greenfield, Wis., assignor to Borg-Textile Corporation, Oak Brook, Ill.

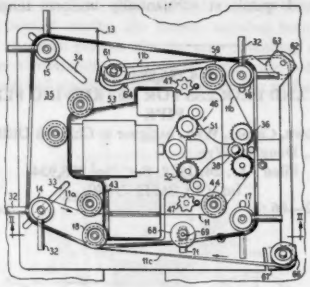
Continuation-in-part of Ser. No. 817,565, Jul. 21, 1977, abandoned. This application Jun. 15, 1978, Ser. No. 915,167

Int. Cl.[2] G11B *23/06*

U.S. Cl. 242—55.19 R **8 Claims**

1. In a film transport system of the type adapted to trasnsport a closed loop of film continuously about a defined pathway, said pathway including a convolutely wound subpathway whose general perimeter is substantially less than the perimeter of said closed loop, and whereabout multiple strip segments of said closed loop are positioned in a slidable, adjacent, face-to-face contact with one another, said transport system including a deck member, on plurality of film guide means positioned said pathway, and film drive means, said film guide means being associated with said deck member and being arranged to define said pathway, including said subpathway, and also including a cross-over pathway extending from the inside convolution of said subpathway, over one edge of said subpathway, and to the outside convolution of said subpathway in which the film travels in a direction from the inside convolution of said subpathway over one edge of said subpathway and to the outside convolution of said subpathway, the improvement which comprises:

(A) engaging means for contacting an inside portion of said wound subpathway film, said engaging means being spatially positioned at a location adjacent said film subpathway between two longitudinally adjacent film guide means,



(B) thrust means functionally associated with said engaging means for reciprocatorily deflecting sidewards said engaging means into said film subpathway, and

(C) a powerhead functionally associated with said thrust means for so deflecting said thrust means.

4,186,893

APPARATUS FOR WINDING STRIPS

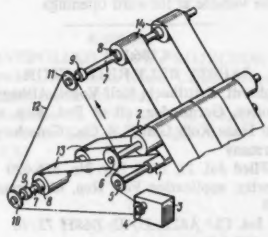
Ivan A. Kolosov, ulitsa Astrakhanskaya 118, kv. 54; Jury E. Ivanyatov, ulitsa M. Zatonskaya, 21, and Vladimir N. Pevnev, ulitsa Ogorodnaya 223, kv. 31, all of Saratov, U.S.S.R.

Filed Oct. 7, 1976, Ser. No. 730,650

Claims priority, application U.S.S.R., Oct. 14, 1975, 2180721[I]

Int. Cl.[2] B65H *19/04, 35/02, 17/20*

U.S. Cl. 242—56.9 **6 Claims**



1. An apparatus for winding strips in longitudinal cutting of a tape which provides for uniform tensioning of the tape along the entire width thereof, the apparatus comprising: at least two substantially parallel drawing rollers adapted to initially engage all the strips and advance the same, prior to separation, at a substantially uniform velocity; at least two spaced receiving shafts substantially parallel to said drawing rollers; a plurality of spools spaced from each other on said receiving shafts and positioned to receive associated strips from said drawing rollers, said spools being supported on predetermined portions of said receiving shafts and having recesses; locking means associated with each of said spools for locking said spools to said receiving shaft in only one relative rotational direction therebetween, comprising a plurality of longitudinal slots along at least said predetermined portions of said receiving shafts and

slot engaging means on said spools, said slot engaging means comprising leaf springs extending through said recesses and into engagement with said slots, each of said spools being selectively rotatable in the other relative rotational direction with respect to its associated receiving shaft to thereby permit selective tensioning of the strips and to permit substantial equalization of the tension in all the strips; and drive means for simultaneously rotating said drawing rollers and receiving shafts to cause the movement of the strips and winding of the same on said spools at substantially uniform tensions and speeds.

4,186,894

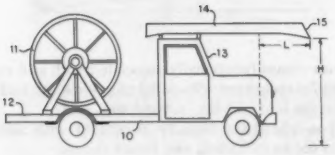
VEHICLE AND PROCESS FOR RETRIEVING FLEXIBLE PIPE

Thomas Brown, Casper, Wyo., assignor to Chinook Utility Products, Inc., Douglas, Wyo.

Filed Apr. 24, 1978, Ser. No. 898,934

Int. Cl.[2] B65H *75/40*

U.S. Cl. 242—86.6 **14 Claims**



1. A pipe-laying vehicle for laying and retrieving flexible plastic pipe comprising:

a self-propelled vehicle having a forward driving compartment;

rear support means for supporting a large reel onto which flexible plastic pipe is carried;

a pickup tube having its rearward opening directed towards said reel and an elevated forward opening visible from the driving compartment, said forward opening having receiving means to receive flexible plastic pipe from directions of up to about 90° to either side of the longitudinal axis of the vehicle at forward openings.

4,186,895

SAFETY BELT RETRACTOR

Wilfried Burghardt, Prittlbach; Rolf Vogel, Althegnenberg, and Ludwig Zauser, Gernlinden, all of Fed. Rep. of Germany, assignors to Hans Kolb GmbH & Co., Grossberghofen, Fed. Rep. of Germany

Filed Jul. 21, 1978, Ser. No. 926,620

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1977, 2733008

Int. Cl.[2] A62B *35/02*; B65H *75/48*

U.S. Cl. 242—107.4 B **38 Claims**

1. A device for rolling up a belt of a safety belt assembly for automobiles and the like, said device comprising:

(a) a housing,

(b) a reel spindle for said belt, said reel spindle being rotatably mounted in said housing,

(c) a first spring means urging said reel spindle in belt rolling-up direction, and

(d) means for locking said reel spindle in said housing against rotation in the belt withdrawal direction in response to a sudden movement of the belt in said withdrawal direction, said locking means comprising:

(e) a locking wheel provided with lateral teeth and having a screw engagement with said reel spindle,

(f) first teeth on said housing facing said lateral locking wheel teeth,

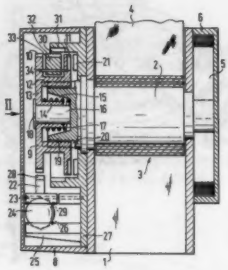
(g) a second spring means urging said locking wheel into a rest position in which said lateral locking wheel teeth are out of engagement with said first housing teeth,

(h) second teeth on said housing,

(i) a locking member movably mounted on said locking wheel adjacent to said second housing teeth,

(j) a third spring means urging said locking member into a rest position out of engagement with said second housing teeth, and

(k) means for moving said locking member from said rest position into engagement with said second housing teeth to stop said locking wheel positively in a predetermined angular position with respect to said first housing teeth,



said locking member moving means being responsive to a predetermined acceleration of said locking wheel by said reel spindle upon said sudden movement of the belt in the withdrawal direction, and

said mutual screw engagement of said locking wheel and said reel spindle driving said stopped locking wheel axially by further rotation of said reel spindle in said belt withdrawal direction for engagement of said lateral locking wheel teeth with said first housing teeth to obtain said reel spindle locking in said housing.

4,186,896

APPARATUS FOR BALLOON LIMITING AT A BOBBIN CREEL

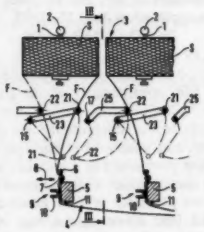
Albert Brandenberger, Oberuzwil, and Manfred Bollen, Zuzwil, both of Switzerland, assignors to Maschinenfabrik Benninger AG, Uzwil, Switzerland

Filed Oct. 10, 1978, Ser. No. 949,765

Claims priority, application Switzerland, Oct. 24, 1977, 12933/77

Int. Cl.[2] B65H *49/14, 57/22*

U.S. Cl. 242—131 **9 Claims**



1. An anti-ballooning apparatus for a bobbin creel arranged between a bobbin mounted upon a bobbin holder of the creel and a thread guide and thread monitoring device operatively associated with such bobbin, the anti-ballooning apparatus preventing contact, entanglement, or both, of the thread bal-

loon formed during withdrawal of the thread from the bobbins of the creel, comprising:

two parallel rods located at a central region between the thread guide and monitoring device and the bobbin and extending in a plane substantially perpendicular to the direction of withdrawal of the thread from the bobbin;

means mounting said two parallel rods for movement between a functional position and a manipulation position;

said mounting means enabling said two parallel rods to be rocked out of said functional position each parallel to itself away from the bobbin holder into the manipulation position where the spacing from the end of the bobbin holder enables doffing of a bobbin mounted on the bobbin holder and a donning of a bobbin upon such bobbin holder.

4,186,897

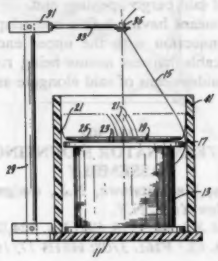
WIRE CONTROL MECHANISM

Maurice H. Brown, 11655 S. Mayfield, Worth, Ill. 60482

Filed Jul. 31, 1978, Ser. No. 929,658

Int. Cl.[2] B65H *59/06*

U.S. Cl. 242—147 R **4 Claims**



1. A wire control mechanism including:

a disc adapted to be mounted on an axial end of a spool of wire,

said disc having a plurality of radially extending resilient filaments that protrude beyond the periphery of the axial end of the spool of wire,

said filaments engaging the wire as it is uncoiled from the spool over the axial end of the spool to thereby apply a resistance to the uncoiling of said wire, and

means encircling said disc and engaging the free ends of said filaments to bend said filaments so that they extend axially of said spool in the direction of uncoiling movement of the wire,

said wire passing between said encircling means and the bent ends of said filaments and engaging said filaments to apply a resistance to said wire as it is uncoiled over the axial end of said spool.

4,186,898

YARN TENSION CONTROL APPARATUS OF THE BALL AND FUNNEL TYPE

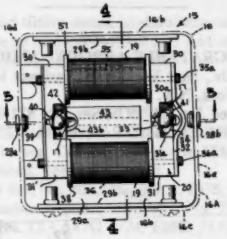
Marlin V. Wilson, Barboursville, Va.; Lawrence C. Nickell, Fairlea, and Larry C. Nickell, Lewisburg, both of W. Va., assignors to Appalachian Electronic Instruments, Inc., Ronceverte, W. Va.

Filed Jul. 27, 1978, Ser. No. 928,571

Int. Cl.[2] B65H *59/24*

U.S. Cl. 242—152.1 **17 Claims**

1. Yarn tensioning apparatus for tensioning a running length of yarn such as textile yarn or the like being drawn from a supply package for delivery at predetermined desired tension level to yarn utilization apparatus such as a beamer or the like, comprising an electronically controlled yarn tensioning device to be controlled by electrical signals from a remote control station and including a housing having yarn inlet and yarn outlet openings for passage of yarn therethrough along a predetermined yarn path, a first yarn tensioning station including a pair of aligned, spaced metallic pole pieces extending transversely within the housing perpendicularly intersecting the yarn path and defining a narrow gap for passage of the yarn through the gap, the pole pieces having shaped recesses therein adjacent the gap collectively defining a seat for a funnel member, a ceramic funnel member defining a truncated conical cavity opening toward the yarn outlet opening supported in said seat and a magnetic spherical ball member located in the truncated conical cavity, the funnel member being located relative to the yarn path so that the yarn extending along said path passes substantially horizontally below the ball member between said ball member and for confronting surface portion



of the truncated conical cavity, an electromagnet coil structure within said housing magnetically linked with said pole pieces for generating magnetic flux to pass through the pole pieces and the gap therebetween exerting magnetic attractive forces on said ball member for varying attraction of the ball member toward the confronting surface portion of the funnel member along which the yarn passes and thereby varying tension of the yarn leaving the yarn tensioning device, and electronic control circuit means remote from said yarn tensioning device and electrically coupled to said electromagnet coil structure for regulating the electrical current supply to said coil structure and thereby regulating the magnetic forces exerted on said ball member.

4,186,899

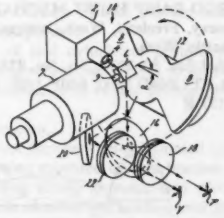
CONTROLLED BEAM PROJECTOR

George W. Stewart, Jr., Costa Mesa, Calif., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 12, 1977, Ser. No. 859,616

Int. Cl.[2] F41G *9/00*; F42B *15/02*

U.S. Cl. 244—3.13 **12 Claims**



1. A controlled beam projector for alternately generating two orthogonally oriented and orthogonally scanned rectangular cross-section beams of radiation, comprising:

means for selectively generating a plurality or orthogonally oriented beams of radiation;

means for selectively energizing said generating means to alternately generate orthogonally oriented beams of radia-

tion having a corresponding predetermined cross-sectional area;

means connected to said energizing means for modulating respective alternately generated beams at pulse rates which vary over respectively non-overlapping predetermined ranges of pulse rate frequency;

means located in the path of said modulated beams for scanning each beam over controlled angles orthogonal with respect to its cross-sectional length dimension;

means in the path of said scanned beams for optically projecting said scanned beams substantially parallel to a central projection axis; and

means connected to said scanning means for controlling the angle of each said orthogonal scan according to a time variable function.

4,186,900

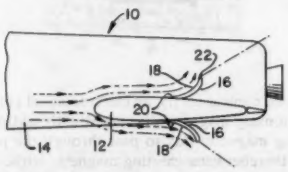
DISINTEGRATABLE AERODYNAMIC BRAKE

Carl M. Loeb, Jr., New York, N.Y., assignor to Carl M. Loeb Trust, New York, N.Y.

Filed Jan. 23, 1978, Ser. No. 871,615

Int. Cl.[2] B64C *9/32*; B64G *1/20*

U.S. Cl. 244—113 **13 Claims**



1. A disintegratable aerodynamic brake for use on a vehicle in a relation of symmetry with another brake for retarding vehicle speed upon re-entry into the earth's atmosphere from space, said brake in the form of a thin, stiff sheet-like member fabricated from a refractory material, said brake presenting a surface of substantial area which is curved concavely toward the direction of vehicle travel and including an inner leading edge portion adapted to be attached to the vehicle and an outer trailing edge portion extending substantially perpendicularly to the direction of vehicle travel, said material of said brake capable of fusing and disintegrating from its outer trailing edge portion progressively toward its inner leading edge portion at a rate substantially equal to the rate said other brake fuses and disintegrates as a consequence of elevated temperatures generated in response to encountering increasing atmospheric resistance upon re-entry of the vehicle from space into the atmosphere thereby to retard the speed of said vehicle.

4,186,901

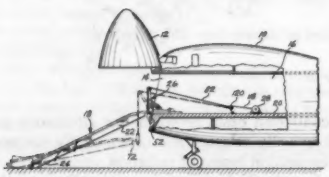
CARGO RAMP HOIST MECHANISM

Thomas H. Shorey, Freeland, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 30, 1978, Ser. No. 873,668

Int. Cl.[2] B64D *9/00*; B60P *1/00, 1/48*

U.S. Cl. 244—137 R **7 Claims**



1. A portable cargo ramp hoist for mounting within an aircraft to facilitate the installation and removal of an elongate cargo ramp that is positioned to extend between the sill region of a cargo opening and the surface of the ground to provide an inclined plane over which cargo can be moved between ground level and the floor of the aircraft cargo compartment, said cargo ramp hoist comprising:

base means positionable inside said aircraft on said cargo compartment floor proximate to said sill region of said cargo opening, said base means including restraint means for removably affixing said base means to said aircraft;

elongate arm means having the first end thereof pivotably attached to said base means for swinging the second end of said elongate arm means inwardly and outwardly through said cargo opening; said second end of said elongate arm means including cable guide means;

actuator means interconnected between said base means and said elongate arm means, said actuator means being operable for swinging said elongate arm means between a first position in which said second end of said elongate arm means is located inside of said cargo compartment and above said cargo compartment floor and a second position in which said second end of said elongate arm means is located outside of said cargo compartment and above said sill region of said cargo opening; and,

cable harness means having a first end adapted for removable interconnection with the upper end of said cargo ramp, said cable harness means being routable through said cable guide means of said elongate arm means.

4,186,902

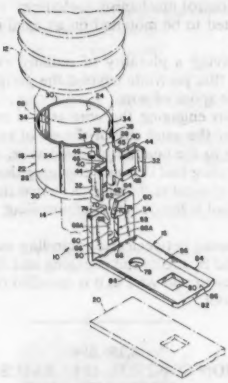
SNAP-LOCK TERMINATOR MOUNTING BRACKET ASSEMBLY

Craig W. Simons, Hackettstown, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed Jul. 14, 1978, Ser. No. 924,821

Int. Cl.[2] F16L *3/08*; H01B *17/16*

U.S. Cl. 248—73 **11 Claims**



1. A terminator mounting bracket assembly of the type for releasably securing and supporting an electrical terminator for electrical cables, said assembly comprising:

(a) a tubular-shaped sleeve member including a wall with opposed edges and an opening extending between said opposed edges, said opening defining two confronting spaced end portions of said wall, said wall comprising resilient material so as to permit said two confronting spaced ends to be movable from a first position where said two ends are normally spaced from each other to a second position where said two ends are spaced closer to one another and are resiliently urged to return to said first position;

(b) a bracket member having a detent means therein; and

(c) a fastener means defined by said two confronting ends

and said detent means, said detent means being adaptable to receive and enclose said two ends when inserted therein only upon said two ends being displaced into said second position, said detent means being adapted to permit said two ends to spring apart in an attempt to return to said first position from said second position and being further adapted to arrest said two ends in a third position wherein said two ends are displaced relative to each other with respect to said first position thereby to effect snap-locking of said sleeve within said detent means.

4,186,903

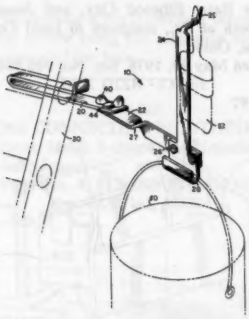
PAINTER'S FIXTURE

Herbert M. Fazakerley, 16 Westdale Rd., Canton, Mass. 02021

Filed May 9, 1977, Ser. No. 795,300

Int. Cl.[2] E06C *7/14*

U.S. Cl. 248—210 **2 Claims**



1. A painter's fixture for a hollow ladder rung comprising:

(a) a base member having an insert section at one end thereof, then extending substantially horizontally for a portion thereof, then twisted and extending in a substantially perpendicular portion to the end thereof, said insert section moveable between a first expandable open position and a second contractable closed position, compressing against the inner surface of said hollow ladder rung to retain the fixture in place;

(b) means to detachably attach a paint-brush by a hole in the handle thereof, including a holder member formed at an upper end with a hook to engage said paint-brush by the hole in the handle thereof and forming a broadened upwardly curling tip thereof to engage a paint-can handle when holder member is fixed to said base member, generally perpendicular and generally vertically to said substantially perpendicular portion of said base member.

4,186,904

ADJUSTABLE MOTOR VEHICLE SEAT

Adolf Reinmöller, Remscheid; Hans W. Voss, Wuppertal, and Bernd Klüting, Radevormwald, all of Fed. Rep. of Germany, assignors to Keiper Automobiltechnik GMBH & Co. KG, Remscheid-Hasten, Fed. Rep. of Germany

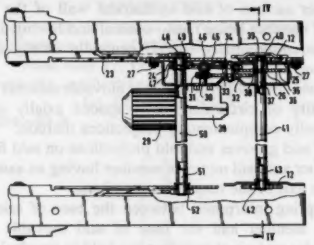
Filed Sep. 14, 1977, Ser. No. 833,334

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1976, 2641243

Int. Cl.[2] A47C *1/02;* A47D *19/04*

U.S. Cl. 248—395 **11 Claims**

1. In a motor driven seat adjuster, particularly for use in a vehicle, a combination comprising a guide rail assembly including a seat rail secured to the seat; a carrier rail movably supporting said seat rail and being pivotally connected at one end thereof to the floor of the vehicle; displacing means including longitudinally directed advancing means attached to said seat rail; tilting means attached to the vehicle floor in operative proximity to the other end of said carrier rail; a driving motor secured to said carrier rail; and coupling means arranged on said carrier rail for coupling said motor to said advancing



means and to said tilting means to simultaneously displace said seat rail relative to said carrier rail and said other end of said carrier rail relative to the vehicle floor.

4,186,905

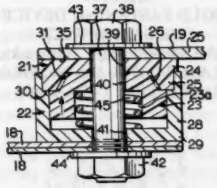
RETRACTABLE TRUCK MIRROR

Otto Brudy, Windsor, Canada, assignor to Dominion Auto Accessories Limited, Toronto, Canada

Continuation of Ser. No. 585,136, Jun. 9, 1975, abandoned. This application Sep. 13, 1976, Ser. No. 722,473

Int. Cl.[2] A47G *1/24;* E05D *11/08*

U.S. Cl. 248—478 **1 Claim**



1. In a mirror, the combination comprising

pivot means comprising a first pivot member,

a second pivot member,

each said pivot member comprising a cylindrical wall and a base,

said cylindrical walls of said first and second pivot members telescoping within one another and including abutting portions limiting axially inward telescoping movement between said pivot members to define a closed chamber,

said abutting portions comprising longitudinally spaced radially extending surfaces,

a movable member in said closed chamber having a cylindrical portion, a frusto conical portion and a base on the frusto conical portion,

the diameter of said cylindrical portion of said movable member being substantially equal to the internal diameter of said cylindrical wall of said second pivot member,

a mirror,

a mounting bracket,

one of said pivot members being mounted on said mirror and the other being mounted on said bracket,

means extending axially through said pivot members and said movable member for holding said pivot members in assembled relation to maintain said chamber closed while permitting relative rotational movement between said pivot members,

axially extending ribs on the cylindrical portion of said movable member and complementary grooves on the cylindrical wall of said second pivot member for guiding said movable member for axial movement relative to said second pivot member and restraining said movable mem-

ber against angular movement relative to the inner surface of said cylindrical wall of said second pivot member,

the inner surface of said cylindrical wall of the first said pivot member being frusto conical and having a plurality of circumferentially spaced generally axially extending grooves therein,

said frusto conical portion of said movable member having a plurality of circumferentially spaced axially extending generally complementary projections thereon,

each of said grooves and said projections on said first pivot member and said movable member having an axis inclined to the axis of the respective members,

and a spring interposed between the base of said second pivot member and the base of said movable member whereby said pivot members are held in angularly related fashion with respect to one another to hold the mirror in position but may be moved to a new angularly related position by moving the mirror angularly with respect to the bracket to cause said projections to move axially out of engagement with said grooves and circumferentially and axially into engagement with others of said grooves,

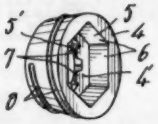
said movable member including a recess surrounded by the cylindrical portion thereof such that the spring extends into said recess and is surrounded by the cylindrical portion of said movable member.

4,186,906

CONCRETE MOLD FASTENING DEVICE AND TOOL FOR SAID DEVICE

Noboru Koga, 4-13-5 Shimoshakujii, Nerima-ku, Tokyo, Japan

Filed Apr. 13, 1978, Ser. No. 896,045
Int. Cl.[2] E04G *17/06, 17/08*
U.S. Cl. 249—41 **1 Claim**



1. A concrete mold fastening device for use in conjunction with a concrete mold having opposing mold members, comprising a horizontal separator adapted to extend between and through the mold members with the opposite extreme ends protruding outwardly of the mold members and each end provided with an annular recess adjacent to and inwardly of each of the opposing mold members, said separator having an integral stop flange formed adjacent each annular recess, a detachable synthetic resin frusto-conical holder having a spiral rib on the outer surface, a polygonal cavity therein, a bottom wall defining one side of said cavity and having a center through hole and a plurality of pliable tongue pieces extending radially inwardly toward the axis of said separator, said bottom wall through hole being disposed on an end of said separator closer to said separator end than said stop flange, and a washer mounted on said separator in abutment against the outer surface of said bottom wall.

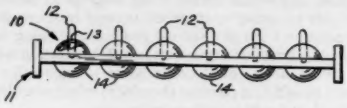
4,186,907

NON-WEIGHT FISHING BAIT CASTER

Bert L. Snodgrass, Rte. 2, Box 2443, Selah, Wash. 98942

Filed Mar. 26, 1979, Ser. No. 24,473
Int. Cl.[2] B22D *5/00*
U.S. Cl. 249—94 **4 Claims**

1. A set for making a non-weight fishing bait caster, comprising, in combination, a tray with a plurality of compartments for receiving water to be frozen, and a cover removably received an said tray for supporting and confining a plurality of rubber



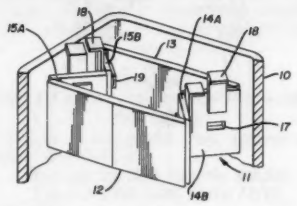
bands, and rubber bands which will be frozen in each of the non-weight fishing bait casters.

4,186,908

EXPANDABLE HOT TOP FOR INGOT MOULDS

Micheal D. La Bate, Ellwood City, and Joseph A. Perri, Coraopolis, both of Pa., assignors to Insul Company, Inc., East Palestine, Ohio

Filed May 30, 1978, Ser. No. 910,866
Int. Cl.[2] B22D *7/10*
U.S. Cl. 249—197 **5 Claims**



1. An expandable hot top for ingot moulds comprising two pairs of preshaped end panels, flexible means hinging said end panels to one another, two preshaped side panels, flexible means hinging said side panels to said end panels in an arrangement wherein the two pairs of end panels fold inwardly against each other to a position between the side panels, hangers with inturned and upturned lower ends and outturned upper ends positioned in apertures in said end panels, whereby movement of the end panels into end-to-end to end relation, moves the side panels outwardly to form the hot top, locking bars positioned across the inside of said end panels between and in engagement with the upturned ends of the hangers hold the hot top in expanded open position in the ingot mould.

4,186,909

FAIL-TO-NEUTRAL MODULE

Kishor Patel, Camilla, Wis., assignor to Dynex/Rivett, Inc., Pewaukee, Wis.

Filed May 23, 1978, Ser. No. 908,793
Int. Cl.[2] F15B *13/042;* **F16K** *31/383*
U.S. Cl. 251—31 **7 Claims**

1. A hydraulic control comprising:

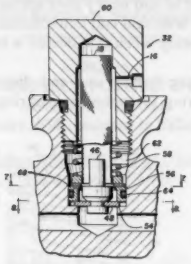
(a) a main spool;

(b) a fluid flow path operatively connected to said main spool and comprising a bridge circuit containing a plurality of orifices at least one of which is a variable orifice; and

(c) means defining a fail-to-neutral orifice which

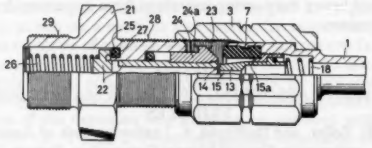
(i) has a flow area large enough so that it does not cause an appreciable pressure drop but a maximum dimension smaller than the smallest orifices in the bridge circuit, said maximum dimension being small enough so that the fail-to-neutral orifice serves as a filter for contaminants in fluid passing through said fluid flow path, and

(ii) is located in said fluid flow path upstream of the bridge circuit,



said means comprising a pin positioned through a hole, the fail-to-neutral orifice being the clearance between the pin and the boundary of the hole.

4,186,910
HOSE CONNECTING MOUTHPIECE
Masanobu Higami, 14-10, 2-chome, Asahi-machi, Takarazuka-shi, Hyogo-ken, Japan
Filed Jun. 8, 1978, Ser. No. 913,556
Int. Cl.[2] F16L *37/28*
U.S. Cl. 251—149.6 **1 Claim**



1. A hose connecting mouthpiece comprising:

(a) an insert (1) having a large diameter portion front end and a small diameter portion (6) rear end to be connected to the hose of a gas filling device;

(b) a union nut (3) loosely fitting around the insert (1) and having an internally threaded front portion engagable with the externally threaded portion of a known nipple, said union nut (3) also having an internal rear flange (5) formed at its rear end fitting around the small diameter of the insert (1);

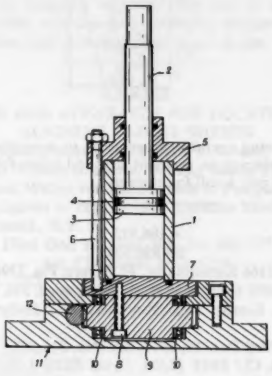
(c) a packing (7) attached to the front end inner periphery of the insert and adapted for contact with a sealing face at the forward end of known nipple;

(d) a core stopper (9) threadly fastened in the insert (1) with an internal small diameter part (11) positioned towards the front end of the insert (1) and a large diameter portion (12) towards the rear end of the insert (1);

(e) a valve core pushing member (13) with a peripheral wall slidably fitted in the core stopper (9) and retractable therein by being pushed by the forward end of the valve core of a nipple, said pushing member (13) including a front end (14) for pushing the valve core of a nipple, a gas flow passage (15) extending therethrough, a gas flow aperture (15a) in its peripheral wall, a small diameter section (16) fitting into the small diameter portion (11) of the core stopper (9) and a flange member (17) fitting into the large diameter portion (12) of the core stopper (9); and,

(f) spring means (18) housed in said insert (1) engaging the valve core pushing member (13) and biasing said valve core pushing member towards the open end of said insert (1) but retained in position by the abutting contact of said flange means (17).

4,186,911
JACK WITH TRANSLATION AND ROTATION MOVEMENTS
Jean P. Huet, rue de Villiersfins, and Alain Courtois, "La Picardiére" Villiersfins, both of 41000 Blois, France
Filed May 17, 1978, Ser. No. 906,885
Claims priority, application France, May 20, 1977, 77 15599
Int. Cl.[2] F01B *21/00*
U.S. Cl. 254—93 R **2 Claims**



1. A jack comprising a cylinder, a piston mounted at the end of a rod which is moved in translation in said cylinder by any pressurizing agent such as hydraulic, pneumatic or oleopneumatic, said jack including a translation bearing mounted in the end of the head of said cylinder, said bearing having a bore of substantially polygonal, curvilinear or oval cross-sectional shape, said rod being slidably mounted in fluid-type manner in said bore and having over the major part of its length a cross-sectional shape corresponding to the cross-sectional shape of said bore so that said rod and said bearing rotate together and said rod is movable in translation in a guided manner in said bearing bore, a base, means for rotatably mounting said cylinder in said base for rotation about the longitudinal axis of said cylinder, a rotation actuating device for rotating said cylinder and hence indirectly said bearing and said rod so that said rod can be actuated selectively with a movement of translation or a movement of rotation or with a combination of these two movements.

4,186,912
ACCIDENT SCREEN
Clyde L. Byrd, Jr., 10505 Burman St., Houston, Tex. 77029
Filed Nov. 29, 1978, Ser. No. 964,596
Int. Cl.[2] E04H *17/00*
U.S. Cl. 256—1 **10 Claims**

1. An accident screen for obscuring the site of motor vehicle or other accident comprising

an elongated screen strip of highly light reflective fabric in suitable safety colors,

a pair of supporting posts secured to opposite ends of said fabric strip,

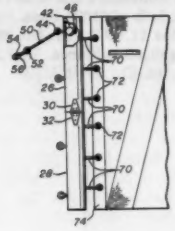
each of said posts being formed of two sections of substantially equal length,

a pair of hinges, one for each post, secured to said post sections to permit said posts to be folded for storage,

means to secure said post sections against folding when unfolded in an erect position,

a plurality of supporting cables secured to and supported on

each of said post section and adjustable in position longitudinally of said sections, and



said posts being operable, when erect, to support said screen strip to obscure an accident site, and when folded, to be wrapped into a roll for storage.

4,186,913

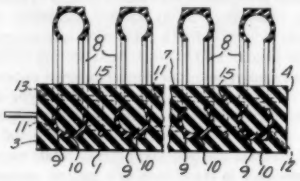
BARRIER

A. J. Bruner, 2166 Katherine St., Ft. Myers, Fla. 33901; Edward T. Foster, 1050 Hollywood Blvd., Hollywood, Fla. 33019, and Thomas N. Kearns, 3500 Pembroke Rd., Hollywood, Fla. 33021

Filed Dec. 18, 1975, Ser. No. 642,199

Int. Cl.[2] E01F *15/00, 13/00;* **E02B** *3/06*

U.S. Cl. 256—13.1 **2 Claims**



1. A barrier section comprising:

(i) a moulded rubber base block of elongated configuration having a top and bottom and sides, and ends normal to said top and bottom,

(ii) a plurality of vehicle tires having beads and a center opening, said tires or fragments thereof being axially aligned and spaced apart and being partially embedded side by side in the top of said block to a depth at least below the beads and being positioned along the length and top of said block and extending in greater part above said block,

(iii) tie rod means extending in said block through the tire center openings, and through the lower part of said block, at opposite sides thereof.

4,186,914

DUAL RATE SPRING DEVICE FOR RAILROAD CAR TRUCKS

Robert P. Radwill, Oak Lawn, and Charles Moehling, Arlington Heights, both of Ill., assignors to AMSTED Industries Incorporated, Chicago, Ill.

Filed Jun. 16, 1978, Ser. No. 916,106

Int. Cl.[2] B61F *5/06;* **F16F** *3/04*

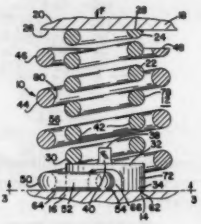
U.S. Cl. 267—4 **4 Claims**

1. A dual rate spring device particularly adapted for use between a bolster and a side frame of a railroad car truck where said truck is used with a railroad car body operated in a lightly loaded condition or in a heavily loaded condition, said device comprising,

a heavy duty spring having one end formed with a convolution projecting inwardly to define an inner receiving space,

a spring retainer element loosely disposed within said inner receiving space of said heavy duty spring end convolution and in contact with said end convolution to inhibit movement of said spring when said device is in a lightly loaded condition, and

a light duty spring having one end disposed within said heavy duty spring to contact said spring retainer and an



opposite end extending outwardly from an opposite end of said heavy duty spring,

wherein said device may be conveniently supported on a horizontal tension member forming in part a pocket in said side frame with said heavy duty spring in contact with said member and only said opposite end of said light duty spring in contact with said bolster to support such in a resilient manner when said car truck is lightly loaded with said heavy duty spring restrained from movement by said retainer.

4,186,915

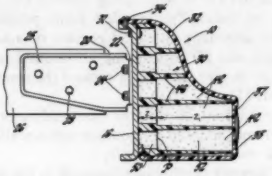
ENERGY ABSORBING CELLULAR MATRIX FOR VEHICLES

Gary P. Zeller, and DeWayne A. Landwehr, both of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 29, 1976, Ser. No. 653,348

Int. Cl.[2] B60R *9/08*

U.S. Cl. 267—140 **2 Claims**



1. A resilient multicelled matrix of plastic material for absorbing energy of an impact load applied thereto comprising a plurality of longitudinally extending cells disposed adjacent to one another, said cells being formed by a plurality of first and second wall means which intersect one another to form polygonal cell spaces therebetween, each cell extending from a back support surface to an outer impact surface so that all impact loads are transmitted to all walls of said cells simultaneously, each of said cells having a polygonal base section of predetermined thickness providing a secondary deflecting zone and comprising a first portion of said first and second wall means of a predetermined thickness extending longitudinally from one end of said matrix to predetermined points between the front and rear ends thereof, each of said cells further having an outer section polygonal in cross section and providing a primary deflecting zone and comprising a second portion of said first and second wall means integral with said first portion and extending directly outwardly from said predetermined points

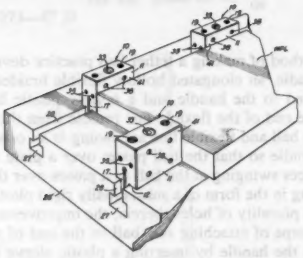
to the other end of said matrix, said wall means being stepped in thickness at said predetermined points forming a discrete plane so that said first portion is substantially thicker at said plane than said second portion to thereby separate said matrix into said primary and secondary working zones.

4,186,916

PRECISION WORKPIECE POSITIONING MEANS FOR MACHINE TOOLS

Paul Varga, Salisbury, Md., assignor to Salisbury Special Tool, Salisbury, Md.

Filed Sep. 18, 1978, Ser. No. 943,144
Int. Cl.[2] B23Q *3/00*
U.S. Cl. 269—303 **12 Claims**



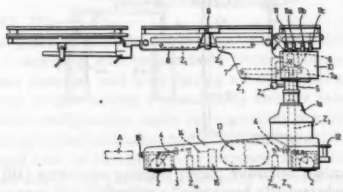
1. A precision workpiece positioner for use with machine tools comprising a rectangular parallelepiped body portion adapted to rest on a machine tool workpiece support table, a divided extension of reduced width projecting from one face of said body portion and adapted to enter the mouth of a machine tool table T-slot, adjustable spreader means for said divided extension on the body portion adapted to expand opposite side portions of the extension into gripping engagement with the mouth of the T-slot, a T-nut engageable adjustably into a T-slot of a machine tool workpiece support table below said body portion, and a bolt threadably engaged with the T-nut and engaged rotationally within a passage through said body portion.

4,186,917

OPERATING TABLE FOR MEDICAL PURPOSES

Arnold Rais, Basel, and André Liissi, Ostermundigen, both of Switzerland, assignors to M. Schaerer A.G., Wabern, Switzerland

Filed Sep. 2, 1977, Ser. No. 830,220
Claims priority, application Switzerland, May 27, 1977, 6595/77
Int. Cl.[2] A61G *13/00*
U.S. Cl. 269—325 **2 Claims**



1. In an operating table for medical purposes, of the type having a plurality of mutually adjustable table parts including a foot and a plurality of rollers accommodated in said foot, a plurality of hydraulic working cylinders for adjusting said table parts with respect to one another, and control means for controlling said cylinders, said rollers being lowerable to enable displacement of said table, the improvement comprising:

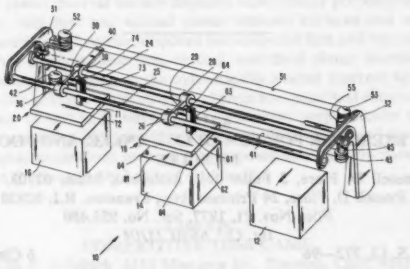
a pressure tank connected to said working cylinders under control of said control means for providing a self-contained pressure fluid source when said operating table is in use, said pressure tank having a capacity for operating said working cylinders through, in the order of, several hundred strokes, a charging unit accommodated in said foot including an electrically operated motor, and a pump driven by the motor for charging said pressure tank, and means for coupling said charging unit to an electrical supply cable, said charging unit being designed to operate only when said operating table is not in use.

4,186,918

METHOD AND APPARATUS FOR LOCATING AND ALIGNING FLIMSY SHEETS

Walter W. Ficker, Fishkill, N.Y.; David E. Lonser, Light House Point, Fla.; William G. Rance, Del Ray Beach, Fla.; Alfred A. Stricker, and Walter von Kaenel, both of Pompano Beach, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 12, 1977, Ser. No. 859,777
Int. Cl.[2] B65H *5/22, 9/08*
U.S. Cl. 271—232 **9 Claims**



5. A system for transporting the aligning flimsy sheets including:

an alignment station with input transfer means to pick up and transfer sheet to said alignment station and output transfer means to pick up and transport said sheets av ay from said station in an aligned state,

said alignment station including alignment means for locator surfaces in said sheets, and said system including pressure control means for suspending the sheets between opposed positive pressure zones derived from the input transfer means and the alignment station to permit general engagement of the alignment means with the locator surfaces in the sheet.

4,186,919

DOCUMENT HANDLING APPARATUS

Joseph F. Miciukiewicz, Trumbull, Conn., assignor to Pitney-Bowes Inc., Stamford, Conn.

Filed Oct. 11, 1977, Ser. No. 840,794
Int. Cl.[2] B65H *5/04, 5/06, 5/26*
U.S. Cl. 271—267 **9 Claims**

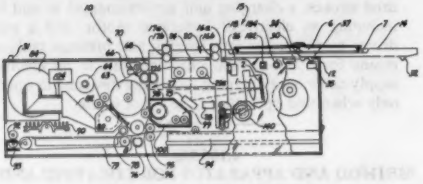
1. A document handling apparatus for a copying machine having a frame and means mounted on the frame defining an illuminating station where a document traversing the illuminating station is illuminated for making a copy of the document, said document handling apparatus comprising:

A. a carriage for supporting a thin or thick document,

B. means for mounting said carriage on said frame and for moving said carriage along a path across said means defining said illuminating station for causing a document on said carriage to traverse said illuminating station,

C. a thin document feeding means mounted on said frame, said document feeding means including

(1) cooperating feed rollers normally positioned in the path of said carriage for feeding a document across said illuminating station independently of said means for moving said carriage and



(2) means mounted by said frame for moving said cooperating feed rollers in a direction transversely out of the path of said carriage and back to said normal position in order to allow said carriage to move along the path across the illuminating station when said document feeding means is disposed out of said normal position.

4,186,920

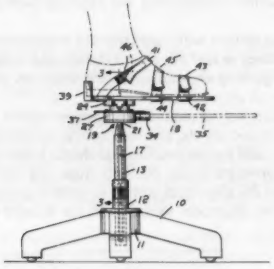
EXERCISER FOR LOWER LEG, ANKLE, AND FOOT MUSCLES

Russell D. Fiore, 3 Fuller Rd., Attleboro, Mass. 02703, and Russell D. Fiore, 24 Princess Ave., Cranston, R.I. 02920

Filed Nov. 21, 1977, Ser. No. 853,450

Int. Cl.[2] A63B *23/04*

U.S. Cl. 272—96 **6 Claims**



1. An exerciser for use in rehabilitation of lower leg, ankle, and foot muscles, said exerciser including a base, a support for a foot, a connection between the base and the central part of the heel area of the support to be tilted in any direction by a foot held by said support and said connection including adjustable means operable to provide a wanted uniform resistance to such tilting of said support, said adjustable means including first and second relatively movable parts, one part including an arcuate scale parallel to the support with a portion exposed laterally thereof of graduations which are calibrated in terms of pounds of torque required to overcome the existing resistance and the other part counter-traversing said scale as the resistance is varied, the first graduation represents a prevailing resistance that holds the foot support against tilting in response to gravity.

4,186,921

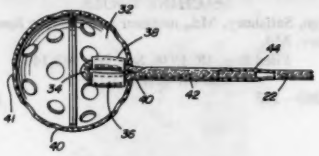
METHOD OF MAKING A TETHERED BALL APPARATUS

Daniel W. Fox, 202 E. Sharon, Phoenix, Ariz. 85022

Filed Apr. 18, 1978, Ser. No. 898,218

Int. Cl.[2] A63B *69/40*

U.S. Cl. 273—26 E **6 Claims**



1. In a method of making a tether ball practice device comprising a handle, an elongated hollow flexible braided plastic line connected to the handle and a hollow plastic ball connected to the end of the flexible line remote from the handle, whereby the ball and flexible line are swung in an orbital path about the handle so that the ball passes over a plate where a batter practices swinging at the ball as it passes over the plate, said ball being in the form of a substantially rigid plastic member having a plurality of holes therein, the improvement comprising the steps of attaching said ball to the end of said line remote from the handle by inserting a plastic sleeve through one of said holes in said ball, passing the end of said line remote from the handle through one of said holes and thence in sequence through said plastic sleeve, forming within said ball a closed loop by turning back and inserting the end of said line into an opening along said braided plastic line within said ball so as to include the plastic sleeve within the loop, securing said handle to the end of said line remote from said ball by providing a unitary resilient hollow plastic handle open at an upper extremity and a lower extremity with a neck at its upper extremity narrow than its lower extremity and wider than the diameter of said line, passing the end of said line through said upper extremity and thence through said lower extremity, and knotting said line projecting through said lower extremity to prevent the knotted line from being pulled outwardly through the neck.

4,186,922

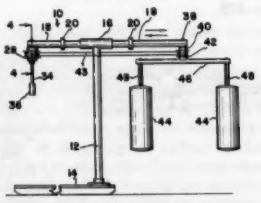
FOOTBALL OFFENSIVE PLAYER TRAINING APPARATUS

John L. Ketchum, 3200 SW. 84th Pl., Miami, Fla. 33165

Filed Apr. 25, 1978, Ser. No. 899,843

Int. Cl.[2] A63B *67/00*

U.S. Cl. 273—55 R **9 Claims**



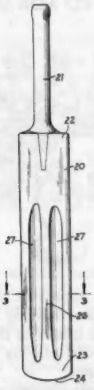
1. A football offensive player training apparatus (10) comprising a substantially horizontally extending rod support (16) circular in cross-section, and having a hollow interior and open ends, a rod (18), said rod supported for sliding motion therethrough and rotary motion about its longitudinal axis thereon, trainer manually operable means (30, 34, 36) mounted on one end of said rod for movement relative thereto, defensive player simulating spaced apart vertically extending dummy means

(44) mounted on the other end of said rod for movement about a substantially vertical axis, and means (28, 42, 43) operatively connecting said trainer manually operable means to said defensive player simulating spaced apart dummy means to control said movement of said defensive player simulating spaced apart dummy means, said apparatus being suitably supported for proper training of football players.

4,186,923
CRICKET BAT

Arthur W. B. Garner, Middlefield Cottage, Great Shelford, Cambridge, England, and John L. Newbery, Robertsbridge, England, assignors to Arthur Winston Buckton Garner, Great Shelford, England

Filed Aug. 14, 1978, Ser. No. 933,493
Int. Cl.[2] A63B 59/08
U.S. Cl. 273—67 D **11 Claims**



1. A cricket bat comprising an elongated handle connected to an elongated blade along the longitudinal axes of said blade and handle to form a continuous elongated implement, said blade shaped to provide a front striking surface and a rear surface at the side opposed to the striking surface, characterised in that said rear surface is formed with at least one depression so configured that the thickness of said blade, in the region of its sweet spot, is greater than the maximum thickness of said blade at that part of the depression edge which is closest to the edge of said blade.

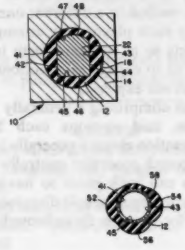
4,186,924
ARTHRITIC GOLF CLUB GRIP

Robert G. Southey, Akron, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 24, 1978, Ser. No. 889,781
Int. Cl.[2] A63B 53/14
U.S. Cl. 273—81.4 **6 Claims**

1. A golf club grip adapted to be mounted on a shaft of a golf club comprising, an elongate body formed from a moldable resilient material, said body having a longitudinal axis and an external surface having a substantially circular external cross sectional configuration taken approximately perpendicular to said longitudinal axis when said grip is not mounted on a shaft of a golf club, an elongate cavity disposed coaxial to the longitudinal axis of said body and adapted to receive a shaft, having a substantially cylindrically shaped external surface, of a golf club therein, said elongate cavity being defined by first and second planar internal surfaces disposed substantially parallel to each other, a third planar internal surface disposed substantially perpendicular to said first and second planar internal surfaces and an arcuate internal surface disposed between said first and second internal surfaces when said grip is not mounted on a shaft of a golf club.

4. A golf club grip mounted on a shaft of a golf club comprising, an elongate body formed from a moldable, resilient material, said body having a longitudinal axis and an external surface, an elongate cavity disposed coaxial to the longitudinal axis of said body and receiving a shaft, having a substantially cylindrically shaped external surface, of a golf club therein, said elongate cavity being defined by first and second planar internal surfaces disposed substantially parallel to each other, a

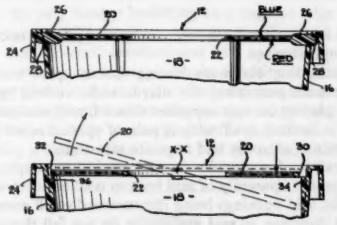


third planar internal surface disposed substantially perpendicular to said first and second planar internal surfaces and an arcuate internal surface disposed between said first and second internal surfaces, said first, second, and third planar internal surfaces conforming to the cylindrically shaped external surface of a gold club shaft received therein to expand said external surface of said body outwarly in a direction perpendicular to the longitudinal axis of said body to form first, second and third elongate projections respectively disposed substantially parallel to the longitudinal axis of said body.

4,186,925
COMPETITIVE TOSS GAME

Adolph E. Goldfarb, 4614 Monarca Dr., Tarzana, Calif. 91356; Erwin Benkoe, deceased, late of Encino, Calif., and Don Robinson, Manhattan Beach, Calif., assignors to Adolph E. Goldfarb and Elisabeth Benkoe, executrix for the estate of Erwin Benkoe, both of Northridge, Calif.

Filed Feb. 10, 1978, Ser. No. 876,659
Int. Cl.[2] A63B 63/04
U.S. Cl. 273—389 **17 Claims**



1. A competitive toss game apparatus for two players comprising:

(a) a plurality of tossable play objects for each player, the objects for each player having indicia thereon associated with that player, indicia on the objects of each player being different from the indicia on the objects of the other player,

(b) a frame for being disposed on a supporting surface,

(c) a plurality of tiltable sections movably supported on said frame above the supporting surface and each overlying a receiver area,

said sections each having a plurality of surfaces with indicia thereon, at least one of said surface indicia being related to said object indicia for one player and at least another of said surface indicia being related to said object indicia for the other player, said sections each being supported for movement incident to being engaged by one of said play objects between a first position where one of its said surface indicia is exposed and a second position where a different one of its surface indicia is exposed,

said apparatus being constructed and arranged to permit play objects to enter each receiver area without moving the associated section to a different one of its said positions, whereby each player may attempt to toss his or her play objects so as to cause them to directly enter receiver areas or to engage said sections so that desired indicia surfaces are exposed,

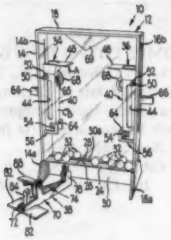
said sections each comprising a generally flat disc having opposite faces, said sections each being pivotally mounted for rotation about a generally horizontal transverse axis disposed generally centrally of said disc so that said discs can each pivot to have opposite faces exposed upwardly, each of said discs having an opening large enough for passage therethrough of one of said play objects.

4,186,926

GAME WITH UPSTANDING TRANSPARENT ENCLOSURE AND MOVABLE FIRING MEANS

Ralph J. Kulesza, Chicago, and Jeffrey D. Breslow, Highland Park, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Aug. 31, 1977, Ser. No. 829,566
Int. Cl.[2] A63F 7/00; A63B 63/04
U.S. Cl. 273—340 **20 Claims**



1. An amusement device for use by two players in competition comprising:

an upstanding enclosure having spaced apart transparent side walls permitting the interior to be viewed by opposing players on opposite sides thereof, said enclosure having a bottom wall with a pair of spaced apart parallel openings adjacent said opposite side walls,

a plurality of projectiles in said enclosure adapted to be projected upwardly of said bottom wall between said side walls, said openings being dimensioned small enough in a first direction so said projectiles do not fall through said openings, said openings being larger than a plurality of projectiles in a second direction,

selectively repositionable firing means for each player positioned outside said enclosure and separate and apart therefrom for movement to any point below one of the paralleled openings with a firing element thereof spaced below one of said parallel openings in said bottom wall and capable of movement to various points within said opening in a second direction, said firing means manually operable by a player to move said element thereof upwardly into a portion of one of said openings to engage and fire a selected projectile upwardly in said enclosure without directly striking other projectiles positioned in said openings, and

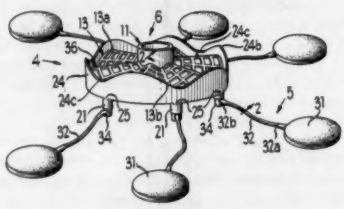
target means for each player mounted in said enclosure having an open upper end for receiving and containing projectiles fired upwardly in said enclosure and including means for holding a selected number of said projectiles, selectively operable releasing means for releasing projectiles within said target means, a player being able to first collect said selected number of projectiles in his target means winning the competition.

4,186,927

PNEUMATIC PROJECTOR GAME WITH CENTRAL TARGET

Jeffrey D. Breslow, Highland Park, and Eugene Jaworski, Park Ridge, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Mar. 13, 1978, Ser. No. 885,972
Int. Cl.[2] A63B 63/02
U.S. Cl. 273—357 **2 Claims**



1. A competitive game apparatus, comprising:

a generally circular frame defining a playing area;

a target mounted in the center of the frame;

a plurality of color-coded playing pieces, at least one for each player of the game;

a plurality of selectively operable pneumatic propulsion means radially positioned remote from said target for propelling the playing pieces toward the target, each of said propulsion means including a movable projectile impeller secured to a piston within a slave cylinder and a compressible chamber in fluid communication with said slave cylinder to provide pressurized fluid to the cylinder to drive the impeller into contact with a playing piece thereby launching it toward the target;

wall means surrounding the playing area for containing the playing pieces and for suporting the playing pieces and for supporting the playing pieces in an off axis position relative to the axis of the movable piston to assure launching of the playing pieces toward the target; and

support means on the playing area in the form of radially extending ridges and valleys for catching and directing inadvertently launched playing pieces toward at least one of the propulsion means to define which player may operate the selected propulsion means so that selective operation of the propulsion means by the selected player may continue until one player has accurately launched all of the associated playing pieces into the target.

4,186,928

BASKETBALL GAME

C. D. Hunt, Jr., Durham, N.C., assignor to Tinker, Inc., Durham, N.C.

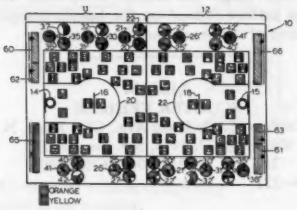
Filed Jun. 29, 1978, Ser. No. 920,549
Int. Cl.[2] A63F 3/02
U.S. Cl. 273—244 **2 Claims**

1. A basketball game comprising:

(a) a game board provided with a field of play having a defined pair of half-courts each with a foul line, goal and time zone designations, each said half-court having indi-

cated thereon a selected plurality of player positions some of which are designated offensive by one color and some of which are designated defensive by a contrasting color and with each such position having a number selected from the numbers 1–5 and being additionally designated as belonging to one of five play areas within the respective court and identified by respective letters A–E, selected offensive-defensive positions in each half-court being positioned within said defined time zone and the same and other selected offensive-defensive positions being located to simulate offensive positions and defensive interference to offensive movements, passes or shots during play of the game;

(b) for each play area in each said half-court, a set of three pointer dial means located outside the boundaries of said half-courts and field of play, one of said dial means in each said set having an offensive color designated face and a preselected number of unequal segments numerically labeled 1, 2, 3, 4, or 5 to correspond to an available player



position, another of said dial means in each set having a defensive color designated face and three unequal segments numerically labeled 1, 2, or 3 and the third said dial means of each said set having a face with a first segment having an offensive color designation labeled "offense rebound", a second segment having a defensive color designation labeled "defense rebound" and a third segment devoid of either offensive or defensive coloring and labeled "score," the size of said various segments being of predetermined varying size;

(c) a set of twenty player game pieces representative of two opposing sets of teams for each said half-court, ten being of one color and ten of a second color designation, each said player game piece being adapted to loosely receive a ball game piece thereon and each having a letter designation corresponding to one of said letter designated play areas; and

(d) a game piece representative of the ball and adapted to loosely mount on any one of said player game pieces.

4,186,929

HYDRAULIC PUMP WITH AN IMPROVED SEALING ARRANGEMENT

Geoffrey W. Burton, Braydon, Nr. Swindon, and Edward G. Morley, Malmesbury, both of England, assignors to Plessey Handel und Investments AG, Zug, Switzerland

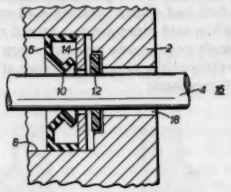
Filed Nov. 2, 1978, Ser. No. 957,023

Claims priority, application United Kingdom, Nov. 24, 1977, 48886/77

Int. Cl.² F16J *15/38, 15/40*

U.S. Cl. 277—27 **6 Claims**

1. A pump comprising a casing, a shaft which rotates in the casing when the pump is in use, a seal which is subjected to pump inlet pressure, a flexible ring member positioned between the seal and an inlet for the pump, and a non-flexible ring member positioned between the seal and the flexible ring member, the pump being such that one of the flexible or non-flexible ring members is mounted on the shaft for rotation with the shaft and the other flexible or non-flexible ring member is mounted around the shaft but spaced from the shaft, whereby when the flexible ring member is not flexed pump inlet fluid can pass to the seal and whereby any sudden increase in pump inlet pressure causes the flexible ring member to flex and seal-



ingly engage with the non-flexible ring member to prevent the sudden increase in pump inlet pressure reaching the seal.

4,186,930

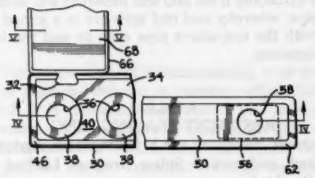
VIBRATION AND DUST ISOLATION SYSTEM

David D. Shulke, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 3, 1978, Ser. No. 961,151

Int. Cl.² B62D *27/04;* **F16J** *15/10*

U.S. Cl. 277—166 **9 Claims**



1. In a vibration and sealing isolation system of the type including first and second, spaced elements (20,22) at least one of which is capable of undergoing undesirable vibration, and which together form at least part of a structure (14) to be sealed, a resilient strip (30) interposed between said first and second elements, and a fastener (26) securing said elements in sandwiching relation to the strip such that the strip seals the interface between the elements and impedes the transmission of vibration across said interface, the improvement wherein said strip is generally planar with a considerable majority (40) of the strip having a first thickness less than the spacing between said first and second elements when said strip is installed therebetween, the strip further including an elongated edge (44,60) having a second thickness somewhat greater than said spacing so as to deflect when installed and seal against one of said elements, and a load bearing portion (38,56) comprising the remainder of the strip and of a thickness somewhat greater than said spacing, said load bearing portion being the predominant part of the strip contacting both said elements while constituting a considerable minority of the surface area of the strip.

4,186,931

PIPE END SEALING SYSTEM

Kenneth W. Anderson, 20 White Fence Acres, Rochester, Ill. 62563

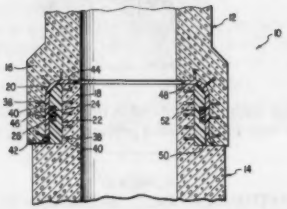
Filed Dec. 2, 1977, Ser. No. 856,761

Int. Cl.² F16J *15/10;* **F16L** *21/02*

U.S. Cl. 277—207 A **10 Claims**

1. A system for joining pipe sections in end-to-end relation comprising at least a first pipe and a second pipe, said first pipe having a bell end and said second pipe having a spigot end, said ends defined by seal members embedded therein, said bell end being configured to receive said spigot end to form a joint between said first and second pipes, said bell end having an

inner surface having at least a portion thereof formed by a bell end seal, said spigot end having an outer surface having at least a portion thereof, formed by a spigot end seal, said inner surface of said bell end circumscribing said outer surface of said spigot end when said pipes are in a joined relationship; so that said end seals engage one another when said pipes are in a joined relationship to seal said pipes at said joint between said seal members;



said end seal members further including integral means for sealing the interface defined between said end seal member and respectively, said bell end and said spigot end of said pipes, said means including a series of continuous ridges extending from said seal members and embedded in said pipe, whereby said end seals are in a joined relationship with the respective pipe ends to seal the interfaces therebetween.

4,186,932

RESILIENT SEALING RING

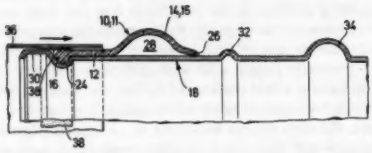
Roland Emhardt, Henggart, and Erich Wachter, Zurich, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jul. 10, 1978, Ser. No. 923,299

Claims priority, application Switzerland, Jul. 14, 1977, 8714/77

Int. Cl.[2] F16J *15/32*

U.S. Cl. 277—207 A **12 Claims**



1. A resilient sealing ring for sealing an annular gap between two overlapping tubes disposed in coaxial moveable relation, said ring having a predetermined cross sectional shape including a pair of arms disposed in folded relation to each other to define a fold therebetween with at least one of said arms being disposed axially of said ring and a second of said arms being foldable into coaxial relation to said one arm to dispose facing sides of said arms in resilient contact with one of the tubes.

4,186,933

KEYS FOR DRILL CHUCKS

George C. Derbyshire, Sheffield, England, assignor to The Jacobs Manufacturing Co., Ltd., Sheffield, England

Division of Ser. No. 753,578, Dec. 22, 1976, abandoned. This application Jul. 12, 1978, Ser. No. 923,975

Int. Cl.[2] B25B *13/44*

U.S. Cl. 279—1 K **3 Claims**

1. A key for a drill chuck comprising in combination, a geared head component and a handle component connected to the geared head component, said geared head component having a handle component connecting portion at one end, a pilot portion at the other end, and a tapered beveled gear portion located between the handle component connecting portion and the pilot portion, said handle portion being made of a synthetic plastic material and in cross section being further formed in the shape of two triangular sections with the sides of each tapering symmetrically toward respective apexes located

on a common center line, said handle component being rotatably mounted on the geared head component and being provided with an overload release mechanism for limiting the amount of torque which can be applied to the geared head component, said overload release mechanism having a spring element housed within the handle component and bearing against a flat surface formed on the handle component connecting portion of the geared head component.

4,186,934

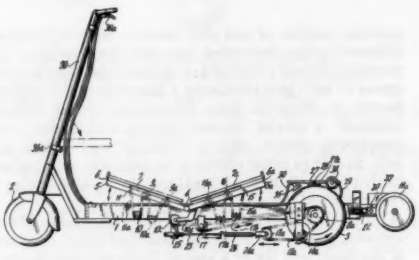
SCOOTER VEHICLE

Thomas J. Collings, 52 Railroad Ave., Glen Head, N.Y. 11545

Filed Sep. 27, 1978, Ser. No. 946,155

Int. Cl.[2] B62M *1/04*; B62K *9/00*

U.S. Cl. 280—221 **5 Claims**



1. A scooter vehicle comprising:

a chassis,

a front wheel mounted on the center line of the chassis,

a rear wheel mounted on the chassis,

a steering column attached to the front wheel,

a pair of ratchet gears, one connected to each side of the rear wheel,

a dual foot platform rotatively mounted on the chassis,

the platform having front and rear foot portions mounted with an angle of less than 180° between them,

first chain and sprocket means connecting the front platform constituting a compounding energy actuating gear mechanism for driving one of the ratchet gears and

second chain and sprocket means connecting the rear platform constituting compounding energy actuating gear mechanism for driving the other of the ratchet gears,

a set of two auxiliary wheels positioned on opposite sides of the scooter frame said wheels being joined for coordinated movement on a common axle mounted on the scooter frame,

means for permitting the set of auxiliary wheels to be swivelled to the rear and locked into an above ground position to avoid riding interference with the two centered main scooter wheels

means for swivelling the auxiliary wheels to ground contact position for four wheel riding balance and manuverability and means for positioning the auxiliary wheels to elevate

the scooter drive wheel above ground contact for free standing pedal operation as an exercising unit.

4,186,935

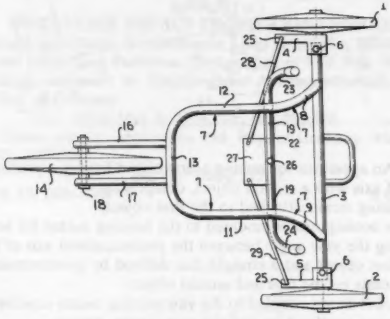
THREE-WHEELED VEHICLE

Lawrence A. Rudwick, 2718 N. Randolph, Arlington, Va. 22207

Continuation-in-part of Ser. No. 600,953, Aug. 1, 1975, abandoned. This application Sep. 16, 1977, Ser. No. 833,988

Int. Cl.[2] B62K *9/02*

U.S. Cl. 280—269 **10 Claims**



1. A multi-wheeled vehicle comprising

an elongated cross member,

at least three wheels each rotatable about a stub shaft,

means mounting a first and a second wheel, one at each end of said cross member for rotation in a plane perpendicular to the elongated axis of said cross member,

means mounting a third of said wheels rearward of said cross member,

a main frame member extending between said cross member and said mounting means,

said main frame member comprising a U-shaped anti-sway bar lying in a plane and having a base and two legs having ends,

said legs having end sections thereof curved at a relatively sharp angle to said plane and terminating at said ends of said legs,

said ends being rigidly secured to said cross member equidistant between said first and second wheels with said plane being generally horizontal.

4,186,936

FRONT SUSPENSION, IN PARTICULAR FOR A VEHICLE HAVING TWO WHEELS AND VEHICLE PROVIDED WITH SAID SUSPENSION

Eric Offenstadt, 58 Avenue G. Clemenceau, 94700 Maison Alfort, and Michel Houze, 43 rue St Louis en l'Ile, 75004, Paris, both of France

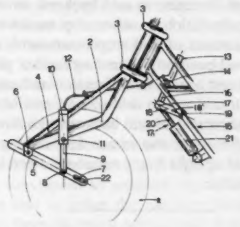
Filed Apr. 26, 1977, Ser. No. 791,032

Claims priority, application France, Apr. 26, 1976, 76 12245

Int. Cl.[2] B62K *21/02, 25/18*

U.S. Cl. 280—277 **4 Claims**

1. A front suspension for a vehicle having an unsuspended part which comprises two vehicle wheels and a suspended part which comprises a frame and a steering framework forming a fork structure pivotally mounted on the frame, the front suspension comprising a substantially U-shaped pivotal suspension arm having two branches pivotally mounted on the steering framework and a transverse portion extending across and around a front wheel of said two wheels, which front wheel has a spindle, the branches carrying the spindle adjacent ends of the branches, a shock-absorbing system comprising at least one telescopic shock-absorber including a suspension spring, the shock-absorber having a part pivotally mounted on said suspended part of the vehicle and a shock-absorber actuating rod axially slidable in said shock-absorber part, a link pivotally mounted on said suspended part, a first pivotal connecting means pivotally connecting the link to the rod, and a hydraulic transmission pivotally connecting the arm to the link, the angular relationship between the link and the rod of the shock-absorber being such that a tangent to the arc travelled through by said first pivotal connecting means and located at said first pivotal connecting means progressively approaches an orientation in which it is parallel to the rod as said first pivotal connecting means travels for a first position corresponding to an outermost position of the rod relative to the shock-absorber part and corresponding to an undepressed state of the front suspension to a second position corresponding to an innermost position of the rod relative to the shock-absorber part and corresponding to a fully depressed state of the front suspen-



sion, said front suspension further comprising at an end of said transmission adjacent the arm a member which has an axis along which it is movable, and second pivotal connecting means pivotally connecting said member to the arm, the angular relationship between the arm and said member being such that a tangent to the arc travelled through by said second pivotal connecting means and located at said second pivotal connecting means progressively approaches an orientation in which it is parallel to said axis along which said member is movable as said first pivotal connection means travels from said first position to said second position thereof, said hydraulic transmission comprising a conduit interconnecting two jacks, one of said jack being connected to the framework and to the pivotal arm and the other jack being connected to the frame and the link.

4,186,937

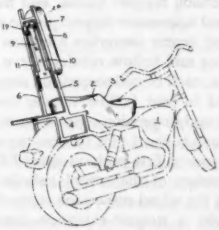
MOTORCYCLE BACKREST DEVICE

Sargent B. Schultz, N168 W16852 Ridgeway Dr., Jackson, Wis. 53037

Filed Apr. 14, 1978, Ser. No. 896,453

Int. Cl.[2] B62J *1/28*

U.S. Cl. 280—289 E **3 Claims**



1. In a cycle having an elongated seat for accomodating both an operator and a passenger in a tandem relationship and a sissy bar carriage structure including a pair of upright frame members that are inclined rearwardly and toward each other, the improvement comprising a backrest device including a backing

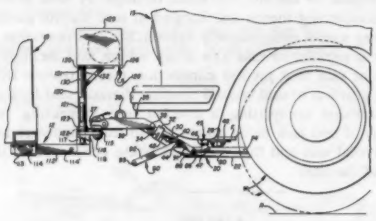
plate, a padded backrest secured to said backing plate and means for selectively positioning said backrest and backing plate between a first position adjacent said frame members for accomodating the back of said passenger and a second position longitudinally spaced from said frame members for accomodating the back of said operator in the absence of said passenger, said selectively positioning means comprising: a pair of laterally spaced flanges mounted on said backing plate; a horizontally positioned pivot stud on each of said flanges; a pair of laterally spaced swing arms, a first end of each of said arms being pivotally mounted on one said pivot stud respectively; a horizontally positioned pivot stud on each of said upright frame members, the other end of each of said arms being pivotally mounted on one said upright frame member pivot stud respectively whereby said backrest pivots relative to said arms in a first direction as said backrest moves from said first to said second position; snubber stop means interconnecting said arms, abutment of said stop means with said backing plate in said second position preventing further pivotal movement of said backrest in said first direction and engagement of said backrest with said seat in said second position preventing further pivotal movement of said backrest in a direction opposite to said first direction; and means for latching one of said arms to one of said upright frame members when said backrest is in said first position.

4,186,938

VEHICLE TOW BAR

John W. Youngblood, 3201 Franklin Ave., Waco, Tex. 76710

Filed Apr. 10, 1978, Ser. No. 894,783
Int. Cl.[2] B60P *3/06*; B62D *53/04*
U.S. Cl. 280—402 **15 Claims**



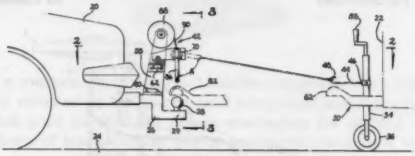
1. A vehicle tow bar adapted to be secured to the chassis of a towed vehicle and to extend outwardly from the front end of the towed vehicle for connecting the towed vehicle to a hitch on a towing vehicle, the tow bar comprising: a tongue; a suspension support beam; means securing said suspension support beam to said tongue; a pair of suspension support pins; means moveably securing one of said suspension support pins to each end of said suspension support beams, said means moveably securing one of said suspension support pins to each end of said suspension support beams comprises a hollow tubular sleeve and means securing said hollow tubular sleeve to said suspension support beam, each of said suspension support ends being slideably disposed in said hollow tubular sleeve; actuating means secured to said suspension support beam and associated with said suspension support pins for moving said suspension support pins between a first position spaced from the wheel suspension mechanism of the towed vehcile and a second position engaging the wheel suspension support mechanism of the towed vehicle; a tongue extension connector on the tongue, said tongue extension connector being upwardly inclined relative to said tongue; a tongue extension; means adjustably and detachably securing said tongue extension to said tongue extension connector; and a hitch coupler secured to said tongue extension, said coupler being adapted to engage the hitch on the towing vehicle.

4,186,939

ELECTRO-MECHANICAL DOCKING APPARATUS AND METHOD

Leslie A. Woods, 24021 Mill Valley Rd., Valencia, Calif. 91355, and Christopher Van Peski, 5386 Jed Smith Rd., Hidden Hills, Calif. 91302

Filed Aug. 21, 1978, Ser. No. 935,488
Int. Cl.[2] B60D *1/16*
U.S. Cl. 280—477 **19 Claims**



5. An apparatus for mating a first object having a predetermined axis with a second object, comprising:

housing means attached to the first object;

yaw sensing means mounted to the housing means for sensing the yaw angle between the predetermined axis of the first object and a straight line defined by predetermined points on the first and second object;

bracket means coupled to the yaw sensing means capable of being revolved around the yaw sensing means;

pitch sensing means attached to the bracket means for sensing the distance between predetermined points on the first and second objects;

reel means revolvably mounted to the housing means and capable of storing a cable;

cable means attached to the reel means for attachment to the predetermined point of the second object;

tension means operably connected to the reel means for keeping the cable means taut;

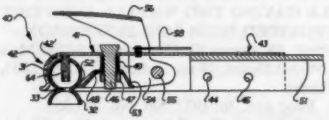
follower tube means rotatably connected to the pitch sensing means and surrounding a portion of the cable means for coupling directional information from the cable means to the pitch and yaw sensing means.

4,186,940

LOCKING-BALL FOR TRAILER HITCH

Arthur W. Pillars, Clearwater Rd., Star Rte. B, Satsuma, Fla. 32089

Filed Feb. 12, 1979, Ser. No. 11,119
Int. Cl.[2] B60D *1/06*
U.S. Cl. 280—507 **7 Claims**



1. In a trailer coupling which includes a ball-type connector carried by a tow vehicle, and an apparently unprotected trailer hitch carried by the trailer, said trailer hitch being of the lever type, and having an elongated channel portion, with a socket in one end, in which channel portion a cam means is disposed for actuation against a jaw by said lever, and said jaw in cooperation with said socket snugly holds said ball in position, the improvement comprising,

a locking-ball means removably disposed within said socket, said locking-ball means comprising,

(i) a substantially spherical shell having no visible locking means,

(ii) a hardened steel bolt threadedly disposed for vertical axial movement in said spherical shell so as to exert,

with said bolt's upper end, a biasing force against the inner surface of said socket, whereby sufficient force is exerted by said shell against said inner surface so that said lever is locked in position, said bolt's lower end being adapted to matingly receive an end of

(iii) a key means introduced from under said spherical shell, said key means when mated to said bolt's lower end being effective to rotate said bolt into, and out of biasing engagement with said inner surface of said socket.

4,186,941

INFLATABLE IMPACT PROTECTION CUSHION

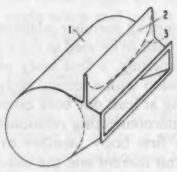
Hansjürgen Scholz, Echterdingen; Luigi Brambilla, Böblingen, and Hans-Gerd Backhaus, Stuttgart, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed May 3, 1978, Ser. No. 902,495

Claims priority, application Fed. Rep. of Germany, May 18, 1977, 2722551

Int. Cl.² B60R *21/08*

U.S. Cl. 280—743 **6 Claims**



1. An inflatable impact protection cushion for a passenger of a motor vehicle, said cushion comprising a bag expandable to a maximum volume and separating means separating a portion of the bag from the remainder thereof for limiting the degree of expansion of said bag to a volume less than said maximum volume when an internally supplied gas exerts an expansion pressure below a predetermined value, said separating means being constructed for being rendered inoperative when said gas exerts an expansion pressure greater than said predetermined value to enable said bag to be expanded to said maximum volume, and inflation means for initially supplying said gas in a manner exerting said pressure less than said predetermined value to initially expand said bag to said lesser volume and for subsequently supplying an additional amount of gas in a manner exerting a pressure greater than said predetermined value to expand said bag to said maximum volume.

4,186,942

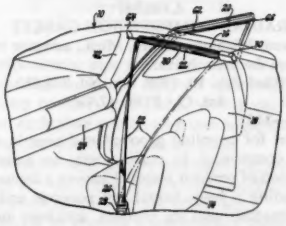
PASSIVE SHOULDER BELT

Chimanbhai M. Patel, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 21, 1978, Ser. No. 944,258

Int. Cl.² B60R *21/10*

U.S. Cl. 280—804 **1 Claim**



1. In a motor vehicle body having a roof rail defining a door opening, and a door mounted laterally adjacent an occupant compartment having a seat;

a shoulder belt having inboard and outboard ends;

means mounting the inboard shoulder belt end adjacent the inboard occupant hip;

means mounting the outboard shoulder belt end on the roof rail generally adjacent the shoulder of the occupant;

one of said mounting means including a retractor;

a carriage having a guide loop slidably receiving the shoulder belt intermediate the inboard and outboard ends thereof;

a track mounted on the roof rail and mounting the carriage for longitudinal movement between a rearward position and a forward position;

and a drive cable of fixed length having a rearward end attached to the upper rear corner of the door and a forward end attached to the roof rail adjacent the forward end of the track so that the drive cable assumes a position generally coincident with the track when the door is closed and assumes a position angularly divergent from the track when the door is open;

said drive cable extending slidably through the guide loop to permit rearward retraction of the carriage by the retractor as the drive cable converges with the track during door closing movement to establish the belt in the restraining position and to drive the carriage forward as the cable diverges from the track during door opening movement to unwind the belt from the retractor and move the shoulder belt forwardly of the occupant to facilitate ingress and egress.

4,186,943

SECURITY DEVICES

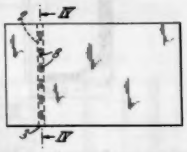
Peter D. Lee, Hertford, England, assignor to The Governor and Company of the Bank of England, London, England

Filed Sep. 23, 1977, Ser. No. 836,139

Claims priority, application United Kingdom, Sep. 24, 1976, 39820/76

Int. Cl.² B42D *15/00*

U.S. Cl. 283—7 **13 Claims**



1. A sheet element incorporating an optical authenticating device comprising a thin film dichroic element disposed within the thickness of the sheet element, said thin film dichroic element comprising a stack of thin film layers and having known characteristics of spectral reflectance and transmittance, and wherein the transmissivity of the sheet element varies about the thin film element so that at at least one point where said transmissivity is relatively great said sheet element constitutes a pair of superposed windows between which the thin film element extends so as to be visible though each window, thereby to permit observance of said characteristics of spectral reflectance and transmittance.

4,186,944
SECURITY DOCUMENT

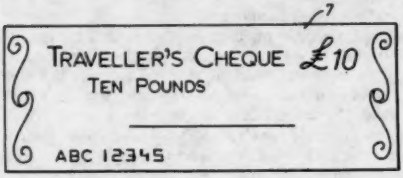
Ralph R. Pearce, West Drayton, England, assignor to EMI Limited, Hayes, England

Continuation of Ser. No. 728,058, Sep. 30, 1976, abandoned, which is a division of Ser. No. 568,530, Apr. 16, 1975, Pat. No. 3,998,160. This application Apr. 28, 1978, Ser. No. 901,229

Claims priority, application United Kingdom, Apr. 17, 1974, 16699/74

Int. Cl.² B42D *15/00*

U.S. Cl. 283—8 R **6 Claims**



1. A security document including a carrieer of a material having an ink permeable surface and having printed thereon a design delineated by the form of a security ink deposit so that the authenticity of the document can be verified, wherein at least a portion of said document design is printed with a security ink including alignable magnetisable particles said alignable magnetisable particles in at least one selected area of said design being printed in position on said ink permeable surface so that they are substantially aligned in a preselected distinct direction, the distinct direction being detectable to verify the document as authentic.

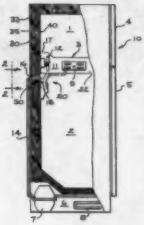
4,186,945
TRANSITION SLEEVE FOR A CABINET OR THE LIKE

Thomas M. Hahn, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Dec. 27, 1977, Ser. No. 864,979

Int. Cl.² F16L *35/00*

U.S. Cl. 285—19 **10 Claims**



1. In combination a refrigerator cabinet having insulation contained in a cavity formed by first and second walls of said cabinet, the walls having juxtaposed openings therein through which tubing or the like may pass with the opening in the first wall having a plurality of notches and a transition sleeve, said sleeve comprising:

a unitary tubular body of a relatively rigid material;

mounting means formed at a first end of said body securing the body to the opening in the first wall, said mounting means including a plurality of locking tabs telescoped through the opening notches in the first wall and rotated thereabout;

said first end of said body including a first annular flange adapted to seal the opening on the cavity-side thereof;

a second annular flange at the second end of said body adapted to seal the opening in the second wall on the cavity side thereof; and

locating means formed on the second end of the body adjacent said second flange on the side opposite the first flange and inserted through the opening in the second wall on the sleeve.

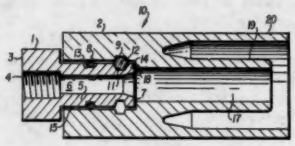
4,186,946
ROTATABLE HOSE OR TUBE COUPLING

John P. Snow, Sagamore Hills, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed May 13, 1977, Ser. No. 796,533

Int. Cl.² F16L *27/08, 33/20*

U.S. Cl. 285—94 **28 Claims**



1. A rotatable coupling member adapted for attachment to the end of a hose or tube to be used in the conveyance of a fluid under pressure comprising, a first body member in rotatable interlocked relationship with a second body member, said first body member having at least one bore extending therethrough providing a fluid interconnecting relationship between means for connecting the first body member to a source of fluid disposed at a first end thereof and the outer end of a substantially tubular shaped insert extending away from a second end of the first body member and having an annular retainment groove disposed in its outer wall, said second body member having a bore at a first end thereof axially aligned with the insert bore and having an inner wall disposed in receiving relationship about the outer wall of the insert and extending through at least one bore to a second end thereof having means for connecting the second body member to a source of fluid, an annular retainment receiving groove in the inner wall of the second body member receiving bore disposed in substantial axial aligned relationship radially outwardly from the retainment groove in the outer wall of the first body member insert, retainment means between the first and second body members extending radially outwardly from the first body member retainment insert groove into the substantially axially aligned retainment receiving groove in the inner wall of the second body member receiving bore as a result of axially compressing the first body member insert so as to cause the original cross-sectional shape of the insert retainment groove to be altered in such a manner as to displace the retainment means originally disposed therein radially outwardly to provide a rotatable interlocked relationship between the first and second body members, and resilient means for sealing against fluid leakage disposed between the rotatable interlocked first and second body members.

4,186,947
RADIAL COMPRESSION GASKET

Larry R. Nixon, Michigan Center, Mich., assignor to Aeroquip Corporation, Jackson, Mich.

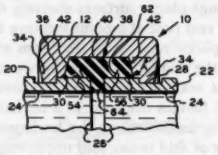
Filed Feb. 10, 1978, Ser. No. 876,682

Int. Cl.² F16L *17/04*

U.S. Cl. 285—112 **6 Claims**

1. A gasket for coupling grooved end pipe in end-to-end relationship comprising, in combination, an annular gasket member formed of resilient material having a transverse cross section including a base, lateral leg portions and a central portion intermediate said leg portions, said base and leg portions having outer cylindrical and conical coupling recess engaging surfaces, respectively, said leg portions each includ-

ing an annular lip surface adapted to engage a pipe circumference intersected by an inner leg portions surface disposed toward said central portion, said central portion including an innermost bulbous convex surface merging from slope surfaces each in a spaced opposed relationship to an inner leg portion surface when said gasket is in a relaxed non-compressed condition whereby opposed inner leg portion and slope surfaces define annular cavities, said leg portions deflecting toward said central portion upon engaging a pipe circumference and the configuration of said opposed inner leg portion and slope surfaces being substantially planar in transverse cross section



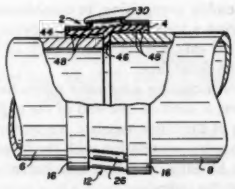
and of substantially equal radial length and intersect to define a first acute included angle when said gasket is in the relaxed state whereby compression of said gasket central portion in use engages said opposed inner leg portion and slope surfaces to completely eliminate said cavities and extrudes said central portion between the opposed ends of the pipe being coupled, said central portion bulbous convex surface being of such configuration and dimension to define a radial compression sealing surface on the pipes' circumferences adjacent the ends thereof to seal the regions of said engaging inner leg portions and slope surfaces.

4,186,948

PIPE JOINT CLAMP

Allan D. Cronk, 950, Greenwood Rd., West Vancouver, British Columbia, Canada (V7S 1X7)

Filed Oct. 2, 1978, Ser. No. 947,378
Int. Cl.[2] F16L *17/04, 21/06, 33/08*
U.S. Cl. 285—177 **7 Claims**



1. A generally circular pipe joint clamp adapted to compress a flexible packer around a joint between substantially aligned pipes, the clamp comprising a plurality of plates forming a flexible shield, each plate overlapping one neighbouring plate and underlying the other neighbouring plate,

a joint in between each pair of neighbouring plates except the plates at each end of the flexible shield to allow the plates to pivot relative to each other; and

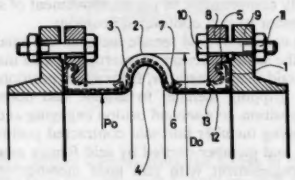
clamping means to provide a compressing force to be applied to the flexible shield.

4,186,949

ELASTIC PIPE-CONNECTING COMPONENT FOR PIPES OR PIPELINES, OR THE LIKE

Zoltán Bartha; Péter Szór, and József Haraszti, all of Budapest, Hungary, assignors to Taurus Gumiipari Vallalat, Budapest, Hungary

Filed Apr. 21, 1978, Ser. No. 898,984
Int. Cl.[2] F16L *27/10, 51/02*
U.S. Cl. 285—226 **2 Claims**



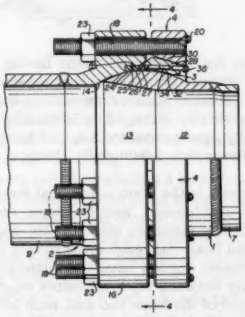
1. An elastic component containing reinforcing fibers, having a pair of radially outwardly extending end flanges and snap-flanges disposed endwise inwardly from said radially extending flanges thereby to define a groove between said radially extending flanges and said snap-flanges for the reception of rings by which each end of the component is secured to an adjacent pipe or pipeline or the like, said component having an outwardly extending annular bulge at its midportion and a locally reinforced cylindrical portion on each side of said bulge between said bulge and the adjacent said snap-flange, in the undeformed condition of the component, said fibers being disposed at an angle less than 55° relative to the axis of the component whereby, upon the imposition of internal pressure to the component, said cylindrical portions of the component can form two additional radially outwardly extending bulges.

4,186,950

COUPLING APPARATUS

Lloyd E. Billingsley, and Raymond E. Latham, both of Houston, Tex., assignors to Comex Marine Services, Inc., Houston, Tex.

Filed Sep. 14, 1977, Ser. No. 833,085
Int. Cl.[2] F16L *27/06*
U.S. Cl. 285—270 **9 Claims**



1. coupling apparatus capable of joining elongated members in an articulated relationship comprising:

a male member adapted for connection to one of said elongated members and having a radially enlarged end portion with an external spherical surface thereon;

a female member adapted for connection to another of said elongated members and into which said radially enlarged end portion may be inserted for mating engagement therewith;

a gripping member, carried by said female member, radially movable from a normally expanded position, in which said male member may be freely inserted and removed from said female member, to a contracted position gripping said enlarged end portion of said male member, preventing removal of said male member and locking it in a fixed articulated relationship with said female member, said gripping member forming a ring comprising a plurality of rigid segments separated by a plurality of resilient segments therebetween, said resilient segments being circumferentially compressible to permit movement of said gripping member to said contracted position;

a load ring carried by said female member and axially movable, in the same direction of insertion of said male member into said female member, from a first positions, allowing said gripping member to assume said normally expanded position, to a second osition engaging and forcing said gripping member into said contracted position; and

an annular seal member carried by said female member for sealing engagement with said male member upon said movement of said gripping member to said contracted position;

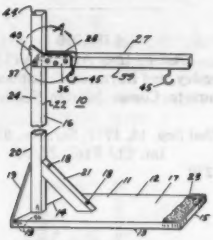
at least some of said rigid gripping member segments being provided with pin means movable, from a retracted position within said segment to an extended position engaging said seal member for placing an additional sealing force thereon in an axial direction toward said female member.

4,186,951

MACRAME LOOM

Richard Stephenson, 34450 Dequindre, Sterling Heights, Mich. 48077

Filed Oct. 26, 1977, Ser. No. 845,578
Int. Cl.[2] D03J 3/00
U.S. Cl. 289—16.5 **1 Claim**



1. In a loom for working macrame having an adjustable beam support means for an elongated substantially parallel sided beam of generally square cross-section horizontally supported on a vertically arranged, substantially parallel sided post of generally square cross-section, said beam having a butt end with a cross-section substantially identical to that of said post;

the improvement in the beam adjustment means comprising;

a pair of cantilevered, mirror image, one-piece, sheet metal, fulcrum members disposed on opposite vertical sides of said beam end, each piece having a generally flat guide extension portion having substantially parallel and horizontally disposed top and bottom edges extending in the direction of the beam end axis, each of said beam end extension portions having an inner plane surface aligned with outer vertical plane surface of said beam defining a space gap therebetween approximating the width of one side of the generally square sectioned post, each of said fulcrum members having a guide length portion extending from the guide extension portions beyond the beam end straddling the post and terminating substantially adjacent the rear face of said post defining a slipfit recess for receiving said post therebetween, the rearward extremity of said beam guide length portion having diagonal edges extending rearwardly and upwardly from said guide extension top edges from a point adjacent the front of said post to break corners located congruent with the rear edges of said post;

said guide length portions having tab members inwardly bent at said break corners horizontally at substantially 90 degrees to the planar sides of the guide portions around the rear face of said post towards the center thereof to define generally congruent rectangular pressure flange pads positioned upwardly from said beam and having their inner edges terminating short of the center of said post to define a substantially small clearance gap therebetween to prevent said edges from overlapping each other, and inner flange planar surfaces abutting flush against the front side of said post at a point locating the inner flange surfaces in spaced relation to the beam at a distance approximating the width of the post between said beam end and said post rear face with the top break corners and edges of said flanges disposed in a horizontal plane substantially three inches above the horizontal plane of the upper surface of said beam, said upper edges and corners of said tab flanges being disposed a substantial distance above the lower edges and flanges of said tabs to define a substantial pressure area for engagment with the front side of said post;

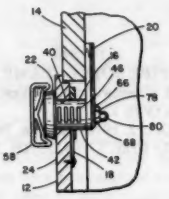
and means clamping said fulcrum guide extension portions rigidly and fixedly to the sides of said beam to secure said tab flanges in cantilevered relationship to said beam end and post.

4,186,952

TURN BUTTON LATCH

Dwight W. Glass, Rockford, Ill., assignor to Keystone Consolidated Industries, Inc., Peoria, Ill.

Filed Jul. 27, 1978, Ser. No. 905,881
Int. Cl.[2] E05C 3/04
U.S. Cl. 292—202 **12 Claims**



1. A latch assembly comprising, in combination:

a housing having a longitudinal axis, a cylindrical through bore along the axis, a front face, a back face, and a counterbore in the front face;

a latch member including a cylinder projecting through the through bore, a knob on one end of the cylinder for manual rotation of the latch member, a counterbore flange in opposed, cooperative relation with the front face counterbore of the housing, and bolt attachment means on the other end of the cylinder;

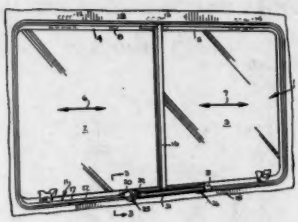
a bolt cooperatively engaging the bolt attachment means and rotatable in response to manual rotation of the knob, one of said counterbore flange and said counterbore including at least two recesses and the other of said counterbore flange and said counterbore including at least one projection for cooperation with said recess to maintain the latch member in a fixed position relative to the housing, said latch member being elastic along the longitudinal axis to permit flexure of the latch member and removal of the projection from the recess upon rotation of the latch member about the axis.

4,186,953

CLOSURE LATCH MECHANISM WITH CLOSING PRESSURE CAM

Daniel P. O'Connor, Parsippany, N.J., assignor to Elcon-National, Inc., Totowa, N.J.

Continuation of Ser. No. 632,312, Nov. 17, 1975, abandoned.
This application Feb. 4, 1977, Ser. No. 838,521
Int. Cl.[2] E05C *3/04*
U.S. Cl. 292—210 **14 Claims**



1. In combination with a closure which is mounted on a structure defining an opening and which moves toward and transversely to a plane in which said opening lies for moving a portion of said closure in a direction toward said plane and into engagement with a portion of said structure, a latch assembly comprising a latch bar member, means pivotally mounting said member on one of said closure and said structure, said means providing a pivot axis for said member spaced from said one of said closure and said structure and lying in a plane substantially parallel to said first-mentioned plane and extending transversely to said direction, said member having a portion spaced from said axis, cam means having a cam axis and a cam face which extends at least partly around said cam axis, and means pivotally mounting said cam means on said one of said closure and said structure with said cam face facing away and spaced from said pivot axis, with said cam substantially parallel to said pivot axis and with said cam face intermediate said portion of said member and said pivot axis for engagement with said portion, said cam face increasing in spacing from said pivot axis from an amount less than the spacing between said portion and said pivot axis to an amount greater than said last-mentioned spacing, said cam means including means engageable with the other of said closure and said structure and movable in a direction for urging said closure in said first-mentioned direction and into engagement with said structure whereby pivotal movement of said member causes said portion thereof to engage said cam face and press said closure in said first-mentioned direction against said structure.

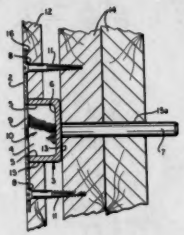
4,186,954

LOCK STRIKE PLATE ASSEMBLY

Harry Detlefs, 3701 Clairmont Rd., Atlanta, Ga. 30341

Filed Sep. 14, 1977, Ser. No. 833,136
Int. Cl.[2] E05C *13/00*
U.S. Cl. 292—340 **3 Claims**

1. A lock strike plate assembly comprising a keeper plate for attachment to the facing of a door jamb, an opening defined in a central portion of said keeper plate, a lock bolt housing rigidly mounted on said keeper plate for insertion into a recess in the facing of a door jamb, said lock bolt housing including a pair of opposed parallel side walls each connected at one edge to said keeper plate on opposite sides of the opening in said keeper plate, and a pair of opposed top and bottom walls each connected at one edge of said keeper plate on opposite sides of the opening in said keeper plate, and a rear wall opposite said keeper plate opening and connected at all four of its edges to said walls, a rectilinear support rod rigidly mounted at one of its ends directly to said rear wall and extending in a direction apoproximately perpendicular to the plane of said keeper plate for insertion into a bore extending through a door facing and into wall studs and the like adjacent the door facing, whereby the support rod derives support from the wall studs to hold the lock bolt housing in position in the door facing and the lock



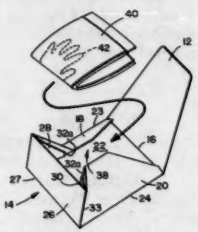
bolt housing derives support from the recess in the facing of the door and from the wall studs to hold the lock strike assembly in its proper position at the door jamb facing.

4,186,955

WASTE MATTER REMOVAL IMPLEMENT AND RECEPTACLE

Maury B. Campbell, Palo Alto, Calif., assignor to Owl-Cam Inc., Palo Alto, Calif.

Filed Feb. 1, 1978, Ser. No. 874,211
Int. Cl.[2] A01K *29/00*; A47L *13/52*
U.S. Cl. 294—1 R **7 Claims**



1. A waste matter removal implement and receptacle comprising an envelope formed of sheet material folded along predetermined fold lines, said envelope having a receiving portion forming an enclosure with an opening, and a flap portion joined to said receiving portion along a line of weakness, said receiving portion including a bottom panel, a pair of side panels joined to said bottom panel along a pair of said fold lines on opposite edges of said bottom panel, and an end panel joined to said bottom panel along another of said fold lines and also joined to said side panels, said pair of side panels and said end panel being movable relative to said bottom panel between a collapsed position in which said side and end panels overlie said bottom panel and an open position in which said side and end panels are substantially perpendicular to said bottom panel, said opening extending between said side panels and overlying said bottom panel such that said receiving portion forms a scoop having a bottom wall and three side walls, said flap portion tucking into said opening of said receiving portion to close said envelope, said flap portion being readily detachable from said receiving portion along said line of weakness to form a cooperating member for pushing waste matter into said opening of said receiving portion.

4,186,956

LOG CARRIER

Dennis E. Flynn, 558 W. 11th, Winner, S. Dak. 57580

Filed Jul. 28, 1978, Ser. No. 929,171
Int. Cl.[2] B65G *7/12*
U.S. Cl. 294—16 6 Claims

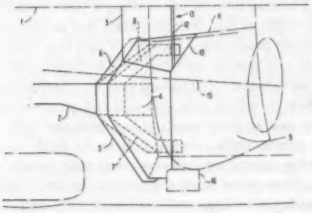
1. A carrier for carrying a plurality of fireplace length logs, said carrier including first and second opposite side pairs of laterally spaced upstanding tong arms defining open sided recesses opening toward each other and including upper and lower base and free ends, respectively, means pivotally connecting the upper base ends of said pairs of tong arms together for relative swinging of the lower free ends of the pairs of tong arms toward and away from each other, a downwardly opening generally C-shaped spring handle including remote handle ends, means pivotally attaching each handle end to a corresponding pair of laterally spaced tong arms intermediate the upper and lower ends thereof for angular displacement of said handle ends relative to said arms about parallel horizontal axes disposed at generally right angles relative to the directions in which said tong arms open, said tong arms being generally L-shaped with the upstanding portions thereof upwardly convergent toward the axis of relative swinging of said tong arms, the lower horizontal portions of the first and second pairs of L-shaped tong arms being laterally spaced, generally straight, horizontally registered and horizontally lengthwise overlapped.

4,186,957

FORWARD LONGITUDINAL BEARER SUPPORTED AT FORWARD END WALL OF SELF-SUPPORTING MOTOR VEHICLE BODY

Hans Lutze, Aidlingen; Dieter Weidemann, Weil der Stadt, and Helmut Weisshappel, Sindelfingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Jun. 2, 1978, Ser. No. 911,926
Claims priority, application Fed. Rep. of Germany, Jun. 3, 1977, 2725084
Int. Cl.[2] B62D *21/00*
U.S. Cl. 296—188 12 Claims



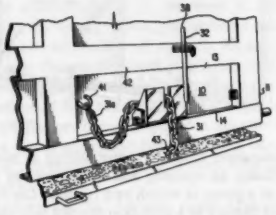
1. A motor vehicle body including a longitudinal bearer and comprising end wall means defining a wall of a passenger compartment and locally bulged out in the direction of the respective vehicle end in a manner forming a rigid body, said longitudinal bearer having an end supported against said end wall and being forked so as to create four arms partially surrounding said rigid body, a lower two of said arms leading to a subfloor forming means and an upper two of said arms terminating within the area of said rigid body.

4,186,958

DUMP-TRUCK TAIL GATE SPREAD CHAIN RELEASE DEVICE

Charlie R. Welch, 200 W. Strathmore, Pontiac, Mich. 48055

Filed Sep. 20, 1976, Ser. No. 724,559
Int. Cl.[2] B62D *25/00*
U.S. Cl. 296—50 3 Claims



1. A truck tail gate holding and releasing apparatus comprising a tail gate holder means including a pivotable member having a slot therein pivotably mounted on said tail gate;

a tail gate chain adapted to be fastened to the bed of a truck having a link thereof placed in said slot for securing said tail gate;

an elongated cantilevered arm connected to said pivotable member including an extended portion for actuating said pivotable member; and

latch means mounted on said gate for releasably securing said arm to said gate by said arm extended portion.

4,186,959

FOLDABLE CHAIR

Sacha Thebaud, P.O. Box 446, Port-Au-Prince, Haiti

Filed Mar. 27, 1978, Ser. No. 889,937
Int. Cl.[2] A47C *4/02*
U.S. Cl. 297—16 24 Claims

1. A foldable chair comprising a pair of support leg frame members hinged together by means of a pivot rod, each of said leg frame members comprising a single length of rod formed substantially as a rectangular frame having an open side pivotably attached to said pivot rod and one of said frame members being of smaller width and length than the other such as to be disposed within the perimeter of the other when in a folded position, a seat frame member and a back frame member pivotably attached to said pivot rod and having overall dimensions smaller than the smaller of said leg frame members for nesting within the periphery of said smaller leg frame member when in a folded position, first tension cable means interconnecting said

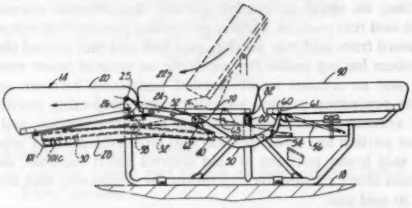
leg frame members in a relative angular position when said chair is erected, second tension cable means for interconnecting said seat frame member and said back frame member in relative angular position when said chair is erected, third tension cable means interconnecting said back frame member and the rearmost of said leg frame member when said chair is erected, biasing means urging said cable means toward said pivot rod when said chair is folded, and a body support surface disposed at least on said seat frame member.

4,186,960

CONVERTIBLE VEHICLE SEAT

Ned W. Mizelle, Lexington, Ky., assignor to Hoover Universal, Inc., Saline, Mich.

Filed Jul. 3, 1978, Ser. No. 921,316
Int. Cl.[2] A47C *13/00*; F16M *13/00*; B60N *1/10*
U.S. Cl. 297—63 **19 Claims**



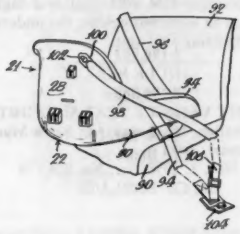
1. A vehicle seat assembly having a frame, a seat member having an inclined support surface and a back member movably mounted on said frame for movement between a seat-defining position in which the seat member is generally horizontal and the back member is upright and a bed-defining position in which the members are in general horizontal side-by-side positions, the back member having upper and lower ends, means pivotally supporting the back member at the lower end thereof for pivotal movement relative to the seat member, coacting track and roller means on said frame and said seat member supporting the seat member for general horizontal reciprocal movement relative to said frame between a forward location in the bed-defining position and a rearward location in the seat-defining position, said track and roller means including a least a pair of track portions and at least a pair of roller members spaced apart longitudinally of said track portions, said pair of roller members being engaged with one of said track portions in said seat-defining position and being movable therefrom into engagement with the other of said track portions in the bed-defining position of said seat assembly, said other track portion and said pair of roller members cooperating to maintain said seat member in a position in which said seat member support surface is generally horizontal, and means cooperating with the seat member to provide for the downwardly and rearwardly pivoting of the back member to its horizontal side-by-side position with the seat member in response to a forward movement of the seat member to its forward location in the bed-defining position of the vehicle seat assembly, and to provide for the upwardly and forwardly pivoting of the back member to its upright position in response to the rearward movement of the seat member to its rearward location in the seat-defining position of the vehicle seat assembly.

4,186,961

CHILD CAR SEATING APPARATUS AND METHOD FOR ASSEMBLING THE SAME

Claude S. Farrell, Jr., Worthington; Richard E. Cone, II, Kent, and Alan D. Ellies, Columbus, all of Ohio, assignors to Buckeye International Inc., Columbus, Ohio

Division of Ser. No. 485,161, Jul. 2, 1974, Pat. No. 3,934,934.
This application Nov. 5, 1975, Ser. No. 628,919
Int. Cl.[2] A62B *35/00*
U.S. Cl. 297—216 **4 Claims**



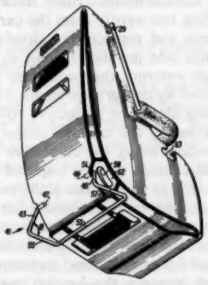
1. A child's car seat and side restraint system for use in an automobile to prevent lateral movement of the child's seat toward an adjacent side of the automobile when the child's seat is positioned on the automobile front seat to the right of the driver's seat, said automobile being of a type equipped with adult seat or lap belts, the improvement comprising, in combination, an outer shell having a generally L-shaped center wall comprising a long wall portion and a short wall portion, one of said wall portions serving as a back wall for the child's seat and the other serving as a bottom wall which rests on the bottom of the automobile seat, said outer shell being securable to said automobile seat through use of said adult seat belts which extend around the bottom wall of said outer shell to anchor the shell to the automobile seat, connector means associated with said back wall of said outer shell, and a side restraint strap separate from said adult seat belts, said side restraint strap having first attachment means at one end thereof for releasably attaching the same to said connector means and having second attachment means at the other end thereof for securing the same to the driver's right seat belt anchor on the rear floor of the automobile.

4,186,962

CAR SEAT SUPPORT AND RESTRAINING STAND

Paul K. Meeker, 412 Park Ave., Kent, Ohio 44240

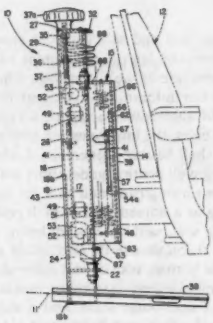
Filed Dec. 22, 1977, Ser. No. 863,308
Int. Cl.[2] A47C *1/08*; A62B *35/00*
U.S. Cl. 297—250 **8 Claims**



1. In an infant car seat having a back, seat and sides, a rigid support and restraining stand comprising

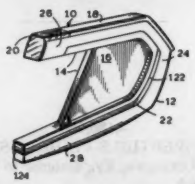
opposed legs;
means for pivotally mounting said opposed legs to said car seat;
a bight member; and
opposed rod members connecting said bight member to the outer ends of said opposed legs, each of said rod members forming an acute angle with said associated opposed leg, said opposed rod members being of a length to allow the bight member to grasp the outer portion of the car seat when said infant seat faces in a rearward direction;
said opposed legs and bight member being of a length and geometrical configuration such that said bight member may be pivoted so as to rest against the underside of said seat while supporting said seat.

4,186,963
UPRIGHT VEHICLE SEAT SUPPORT
L. John Koutsky, Milan, Ill., assignor to Sears Manufacturing Company, Davenport, Iowa
Filed Nov. 1, 1978, Ser. No. 956,776
Int. Cl.[2] B60N 1/02
U.S. Cl. 297—308 **7 Claims**



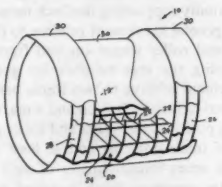
1. A support for a vehicle seat, comprising: roller housing means mountable on the vehicle and extending upright therefrom and including an upright rear main plate disposed transversely to the length of the vehicle and a pair of transversely spaced apart upright roller traces joined to transversely opposite sides of the main plate, each roller trace being of U-shaped section as viewed from above and having their open sides facing toward each other, each roller trace having an upright, laterally in-turned front flange parallel to and spaced ahead of the main plate; upright carriage means of U-shaped section as viewed from above and having an upright front main plate parallel to and spaced ahead of the roller housing means and a pair of parallel upright side members joined to the carriage means front wall and spaced apart transversely a distance less than that of the aforementioned roller trace flanges, said side members extending rearwardly from the carriage means front plate and between and respectively closely adjacent to the roller traces, each side member having an upright laterally out-turned flange entering the proximate roller trace; first roller means carried by the carriage means flanges on fore-and-aft axes for rolling along the respective roller traces; second roller means carried by the carriage means flanges on transverse axes for rolling along the respective roller flanges; an upright height adjustment bracket disposed closely along the rear face of the carriage means main plate; means mounting the bracket means on the carriage means for relative vertical movement; means cooperative between the carriage means and bracket means for selectively locking and releasing the bracket means against and for such vertical movement; helper spring means connected between the bracket means and carriage means and biasing the bracket means upwardly; and suspension spring means connected between the bracket means and the roller housing means for biasing the bracket means and carriage means upwardly as a unit when the locking and releasing means is locked.

4,186,964
SEAT ARMREST
Ralph G. Marrujo, Winston-Salem, and Thomas D. Hire, Lewisville, both of N.C., assignors to Fairchild Industries, Inc., Germantown, Md.
Filed Oct. 23, 1978, Ser. No. 953,889
Int. Cl.[2] A47C 1/12
U.S. Cl. 297—422 **11 Claims**



1. An armrest for a seat comprising a first shell member and a second shell member, said first and said second shell members being interconnected to form a hollow structure having a rear portion, an upper projecting portion that extends outward from said rear portion, a lower projecting portion that extends outward from said rear portion, said first and said second shell members having means for receiving an armrest insert member, and an armrest insert member positioned between said upper projecting portion and said lower projecting portion, said armrest insert member having an upper portion and a lower portion and a rear portion that interconnects said upper and said lower portions of said armrest insert member, said armrest insert member having means for connecting said armrest to said seat.

4,186,965
FIBERBOARD CHAIR CONSTRUCTION
Jon A. Yarbrough, 5714 Vanderbilt, Dallas, Tex. 75206
Filed Mar. 6, 1978, Ser. No. 883,918
Int. Cl.[2] A47C 7/00
U.S. Cl. 297—442 **7 Claims**



1. A furniture item formed of paperboard, comprising:
A support structure of perpendicularly disposed, interlocking panels, a portion of the topside periphery thereof defining seat bottom and seat back portions;
first and second end panels, each being disposed adjacent the support structure on opposite sides thereof, each panel conforming to the shape of the bottom side periphery of the support structure to be coextensive therewith and extending beyond the topside periphery of the seat structure to define armrests on each side of the seat area and to establish a seat area entirely recessed within the periphery of the end panels; and
a rectangular panel of foldable material having two parallel cuts therein that extend longitudinally of the panel for a distance equal to the linear length of the topside periphery portion of the seat structure which defines the seat bottom

and seat back portions and that are spaced a distance from each side of the panel equal to the width of the first and second end panels,

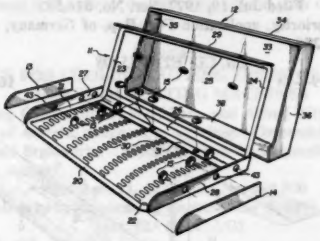
the panel being wrapped around the seat support structure and the end panels with the portion of the panel between the cuts being depressible into the recessed seat area defined by the end panels to overlay the seat bottom and seat back portions of the support structure.

4,186,966

METAL SEAT FRAME WITH ADHESIVELY SECURED EXTERIOR PLASTIC PARTS

Arthur J. Harder, Jr., Franklin Park, Ill., assignor to Coach & Car Equipment Corporation, Elk Grove Village, Ill.

Filed May 5, 1978, Ser. No. 903,232
Int. Cl.² A47C 7/02
U.S. Cl. 297—452 **8 Claims**



1. In a seat, the combination comprising:

a metal seat frame member;

an exterior plastic part having an inner surface facing said frame member;

a securing element having a relatively wide head portion and a relatively narrow shank portion extending from said head portion and terminating at a terminal end;

an opening extending through said frame member for receiving said shank portion;

a first surface on said frame member located around said opening, said first surface facing said inner surface on said exterior plastic part;

a second surface on said frame member, opposite said first surface and located around said opening;

means on said head portion of the securing element for engaging against said second surface on the frame member;

and non-metallic adhesive means for adhesively securing said terminal end of said shank portion to said inner surface of said exterior plastic part.

4,186,967

ICE REMOVING MACHINE

Charles D. Kuhmonen, 5574 Ponderosa, Utica, Mich. 48087

Filed Aug. 7, 1978, Ser. No. 931,614
Int. Cl.² E01H 5/09
U.S. Cl. 299—25 **3 Claims**

1. A machine for removing ice from a surface comprising, in combination,

a body maneuverable over a said surface;

means for supporting the body above said surface;

a plurality of cutting heads depending from the body into proximity to the surface, the cutting heads being mounted on the body for rotation about substantially vertical laterally spaced axes;

power means on the body; and

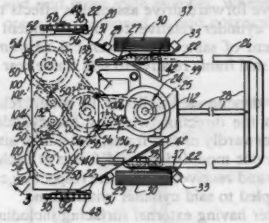
power transmission means coupling the power means to the several cutting heads for concurrent rotation thereof;

each said cutting head comprising a disc and a plurality of chippers fixed to and depending from the disc, each chipper comprising:

a prism of high hardness material with a front, a back and a bottom;

said front being a portion of said prism facing the direction of travel of the chipper;

said back being a portion of said prism facing opposite said front;



said bottom being a portion of said prism furthest from said body and closest to said surface, said bottom comprising a land portion adjacent to the front with a facet substantially parallel to said surface and a relief portion with a facet at an angle from said surface and receding from said surface as it approaches the back of the prism;

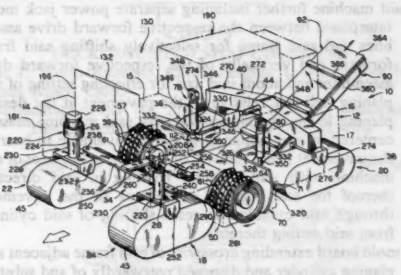
each chipper having a beveled radially outer surface providing cutting clearance at the outer edge of the chipper;

4,186,968

ROADWAY PAVEMENT PLANING MACHINE

Robert M. Barton, Oklahoma City, Okla., assignor to Barco Manufacturing Company, Oklahoma City, Okla.

Continuation of Ser. No. 784,556, Apr. 4, 1977, abandoned. This application Sep. 15, 1978, Ser. No. 942,618
Int. Cl.² E01C 23/12
U.S. Cl. 299—39 **15 Claims**



1. A pavement planing machine for roadways and the like, said machine comprising:

a frame having a forward end and a rearward end,

a pair of forward drive assemblies disposed in side by side spaced apart relation at the frame forward end upon which said frame forward end rests,

said drive assemblies being connected to said frame for independent vertical adjustment of said frame relative to the respective forward drive assemblies,

a rearward drive assembly adjacent the rearward end of said frame on which said frame rearward end rests,

means for pivotally connecting said rearward end drive assembly to said frame for pivotal movement of said frame about a horizontal axis extending forwardly and rearwardly of said frame and centered adjacent the midportion of said frame,

said drive assemblies being at a level that is below said horizontal axis,
said frame having fixed to same on either side of same a depending side sheet,
with said side sheets extending downwardly to said level,
a planing cylinder journaled at said level between said side sheets to extend transversely of said frame and be disposed at said level, for planing engagement with the pavement,
said cylinder being disposed intermediate said frame ends,
whereby vertical adjustment of said frame relative to the respective forward drive assemblies effects truing of said planing cylinder relative to the pavement for planing excisement of same free of vertical adjustment requirement of said frame relative to said frame rear drive assembly,
means for driving said cylinder to rotate relative to said frame in the direction whereby the cylinder underside moves forwardly of said frame, and comprising a separate drive device mounted on said frame at each end of said cylinder and received within the respective cylinder ends and coupled to said cylinder within same,
said cylinder having external surfacing including means for fragmenting the pavement in planing same when rotated in said direction against the pavement surface when said machine is moved forwardly for upcutting excisement of the pavement,
said cylinder surfacing extending lengthwise of said cylinder into close proximity to said side sheets,
said drive assemblies including drive means for moving said machine forwardly along the pavement for moving said planing cylinder, when said cylinder is driven by said cylinder drive means in said direction, relative to the pavement, in the forward direction for planing excisement of the pavement,
with the mass of said machine that is supported by said drive assemblies being oriented to dispose the center of gravity thereof above and in substantial vertical alignment with the forwardly disposed side portion of said planing cylinder external surfacing for countering upward forces acting on said cylinder on forward movement of said machine with said cylinder rotating in said direction thereof for said planing excisement of the pavement,
said machine further including separate power jack means interposed between the respective forward drive assemblies and said frame for selectively shifting said frame forward end vertically of the respective forward drive assemblies and about said axis for effecting setting of said planing cylinder relative to the pavement at the desired planing levels and slope, whereby said machine mass as centered at said center of gravity is available to bear on the pavement being excised, on forward movement of said machine with said cylinder rotating in said direction thereof for said planing excisement of the pavement, through said cylinder, to resist shifting of said cylinder from said setting thereof,
a mold board extending crosswise of said frame adjacent said planing cylinder and disposed rearwardly of and substantially paralleling said planing cylinder,
said mold board being carried by said frame at said drive assembly level forwardly of said rearward drive assembly and said pivotal connecting means thereof,
said mold board being positioned to receive and move forwardly, on forward movement of said machine along the pavement, pavement rubble formed by said rotation of said cylinder and moved over the top of said cylinder by said rotation of said cylinder,
said mold board being formed to define a pavement rubble passing port opening rearwardly of said frame,
an upright pavement rubble retainer fixed to said frame at said drive assembly level adjacent to but forwardly of said cylinder for holding adjacent said cylinder surfacing pavement rubble displaced by said planing excisement of said cylinder for movement over the top of said cylinder under said rotation of said cylinder,
said planing cylinder surfacing including auger means for feeding the pavement rubble adjacent same laterally of said cylinder to said mold board port for passage therethrough rearwardly of said frame,
and conveyor means carried by said frame and having a pavement rubble receiving end disposed at said drive assembly level in pavement rubble receiving relation with said mold board port forwardly of said rearward end drive assembly connecting means and below said horizontal axis level and a pavement rubble discharge end projecting rearwardly of said frame for conveying the pavement rubble for discharge from the rearward end of said frame.

4,186,969

APPARATUS FOR CONTROLLING THE POSITION OF A MINING MACHINE

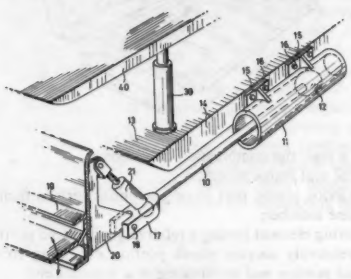
Klaus Beckmann, Lünen, Fed. Rep. of Germany, assignor to Gewerkschaft Eisenhutte Westfalia, Lunen, Fed. Rep. of Germany

Filed Jul. 18, 1977, Ser. No. 816,582

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1976, 2633286

Int. Cl.² E21C *35/08*

U.S. Cl. 299—43 **16 Claims**



1. Apparatus for controlling the position of a mineral mining machine guided for movement on guide means, said apparatus comprising at least one beam connected with said guide means, at least one device operable to adjust the angle between the guide means and the beam and further guide means comprising a piston and cylinder unit arranged at a mounting surface of a support which faces an adjacent support of a mine installation, the further guide means serving to pivotably and displaceably connect the end of the beam remote from the first-mentioned guide means to said support and to permit limited angular mobility of the end of the beam to a limited extent wherein the first-mentioned guide means is disposed at one side of a conveyor, and the beam and the adjusting device are connected with bracket means at the opposite side of the conveyor.

4,186,970

SECTIONAL CONVEYOR WITH SECTIONAL RACK FIXED ON THE CONVEYOR AT ONLY A SINGLE LOCATION

Otto Minke, Essen, and Willy Lanfermann, Bochum, both of Fed. Rep. of Germany, assignors to Ruhrkohle, A.G., Essen, Fed. Rep. of Germany

Filed Jul. 21, 1977, Ser. No. 817,564

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1976, 2633336

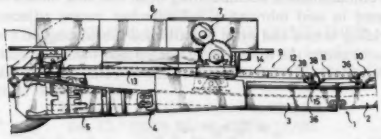
Int. Cl.² E21C *27/36*

U.S. Cl. 299—43 **9 Claims**

1. In a mining machine having a movable cutting head with a driving pinion, a thrust device for said machine comprising:
a sectional conveyor lying in the direction of the path of travel of the cutting head, the sections of said conveyor

being linked together for limited relative displacement along the direction of the path of travel; and

a sectional rack extending along said conveyor for receiving said pinion to traverse the cutting head on the conveyor, the sections of said rack being linked together for relative



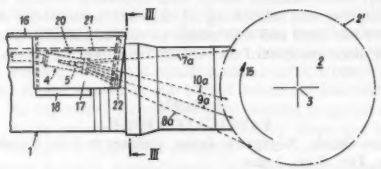
pivotal movement, one section of said rack being fixed to said conveyor at a single location along said rack and conveyor, all other sections of said rack being only slidably retained on said conveyor for movement with respect to said conveyor in the direction of said path of travel.

4,186,971

DEVICE FOR COOLING CUTTING TEETH OF CUTTER HEADS OF CUTTING MACHINES

Wolfgang Gebetsroither, Wolfsberg, and Alfred Zitz, Zeltweg, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft, Vienna, Austria

Filed Apr. 11, 1978, Ser. No. 895,500
Claims priority, application Austria, May 6, 1977, 3251/77
Int. Cl.[2] E21C *7/08*
U.S. Cl. 299—64 **6 Claims**



1. In a rock cutting machine which includes a cutter arm having an inner end and an outer end carrying a toothed cutter which rotates about an axis transverse to the longitudinal dimension of the arm, an improved cooling device for the cutting teeth of the cutter comprising nozzle means for receiving supplies of compressed air and water and constructed to create and discharge a stream of air in which particles of liquid water are dispersed or atomized, said nozzle means being carried by said cutter arm at a location spaced from the cutter toward the inner end of the arm and arranged in a position to discharge the stream toward the cutter in a spray pattern such that the stream impinges on the teeth of the cutter as the teeth pass through the pattern during rotation of the cutter.

4,186,972

LINEARLY MOVABLE STABILIZER FOR SLIDABLE STRUCTURES

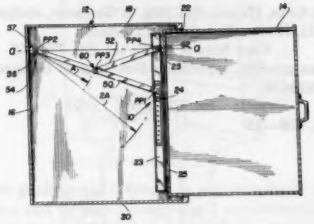
Magnus F. Hagen, 434 Panorama Dr., Laguna Beach, Calif. 92651

Filed May 26, 1978, Ser. No. 909,921
Int. Cl.[2] F16C *29/04*
U.S. Cl. 308—3.8 **4 Claims**

1. A linearly movable stabilizer means for linearly slidable structures wherein sideward cantering is prevented thereby, said means consisting of:

an elongated track member attached to said slidable structure transversely to the linear movement thereof, said track member comprising a bottom longitudinally extending center wall and a pair of oppositely disposed and outwardly and laterally extending ball raceways, whereby said bottom center wall and said raceways define an elongated channel;

a slide mechanism adapted to be slidably supported within said channel, said mechanism comprising an inner slide member having a bottom wall and oppositely disposed ball raceways arranged to be oppositely positioned to respective adjacent ball raceways of said track member, ball-retainer means being positioned between said track member and said inner slide member, wherein ball bearings are operably positioned in said corresponding raceways;



a first long arm member having one end thereof pivotally mounted to a fixed support, and the end opposite thereof pivotally connected to said inner slide member to traverse longitudinally within said channel;

a second short arm member interconnected between said first arm member and said track member, thereby defining a substantially "Y"-shaped configuration, wherein one end of said second arm is pivotally attached intermediate the ends of said first arm member, the opposite end of said second arm being pivotally attached adjacent one end of said track member; and

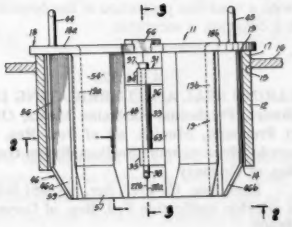
pivot means provided at each attaching end of each arm member to allow a controlled movement of said arms and said slide mechanism.

4,186,973

DECK-MOUNTED SHAFT BUSHING

John T. Work, Anaheim, Calif., assignor to BJ-Hughes Inc., Long Beach, Calif.

Continuation of Ser. No. 773,082, Feb. 28, 1977, abandoned.
This application Jul. 25, 1978, Ser. No. 927,868
Int. Cl.[2] F16C *21/00*
U.S. Cl. 308—3.9 **18 Claims**



1. A guide bushing mountable in a supporting sleeve for a guiding drill string extending through the sleeve, said bushing comprising:

rigid cylindrical tubular core means providing a cylindrical axial bore adapted to receive and guide the drill string, said core means adapted to be disposed in the sleeve and around the drill string;

means for mounting said core means substantially coaxially

in the sleeve while allowing relative transverse movements between said core means and the sleeve, and being operative to prevent any substantial rotation of said core means while permitting unrestricted rotation of the drill string relative to said core means; and

resilient, elastomeric cushion means mounted on the exterior of said core means and adapted to coact with the interior wall of the sleeve to cushion said relative transverse movements.

4,186,974

DEVICE FOR INTRODUCING A FORCE-TRANSMITTING MACHINE ELEMENT INTO A VESSEL

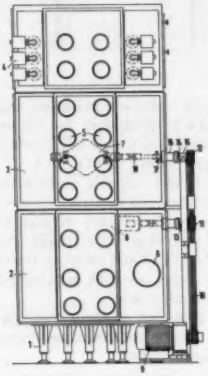
Helmut Grün, Hanau, Fed. Rep. of Germany, assignor to Alkem GmbH, Hanau, Fed. Rep. of Germany

Filed May 6, 1977, Ser. No. 794,568

Claims priority, application Fed. Rep. of Germany, May 10, 1976, 2620636

Int. Cl.² F16C *13/00*

U.S. Cl. 308—15 **2 Claims**



1. Device for introducing a power-transmitting machine element into a vessel containing an aggressive atmosphere and having a wall formed with openings, to the defining margin of which gloves are, respectively, secured, comprising: a flange set into the wall, a sealing bearing for a force-transmitting machine element mounted on said flange at the outside of the vessel, and threaded fastening means accessible from the interior of the vessel for threadedly fastening the machine element to said flange, said flange having an outer peripheral surface formed with a bead-like projection at the outside of the vessel to which a covering is securable.

4,186,975

BEARING SEAL AND LUBRICATING DEVICE

Alois Schwarz, Putzbrunn; Karlheinz Mautz, Ottobrunn, and Hubert Frommlet, Munich, all of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

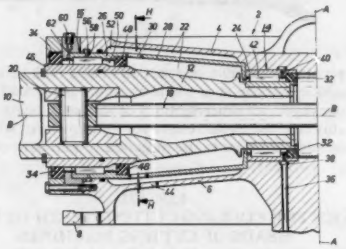
Filed Dec. 16, 1977, Ser. No. 861,560

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1976, 2658409

Int. Cl.² F16C *33/76*

U.S. Cl. 308—187 **10 Claims**

1. A bearing seal and lubricating device for the bearings of a rotor, comprising rotor housing means, radially outer bearing means located in said housing means and radially inner bearing means also located in said housing means, lubricating oil chamber means in said housing means operatively interconnecting said radially outer bearing means and said radially inner bearing means, each bearing means having a first side facing away from said lubricating oil chamber means and a second side facing said lubricating oil chamber means, sealing means sealing said inner and outer bearing means at said first side thereof, shielding means operatively arranged to shield said second side of said radially outer bearing means relative to said lubricating oil chamber means, receptacle means in the form of groove-like contamination accumulating dead end sink means suitably located in said lubricating oil chamber means adjacent said shielding means and open toward said lubricating oil chamber means against the direction of centrifugal force for collecting particles separated under the effect of centrifugal force from



lubricating oil in said lubricating oil chamber means to thereby prevent the entering of such particles into said radially outer bearing means, and conduit means operatively interconnecting said radially outer bearing means to said lubricating oil chamber means thereby substantially bypassing said groove-like dead end sink means, said shielding means comprises sealing ring means sealing said lubricating oil chamber means from the radially outer bearing means, said bypassing conduit means opening into said lubricating oil chamber means ahead of said groove-like dead end sink means as viewed radially inwardly in the direction toward the radially inner bearing means.

4,186,976

FABRICATED DESK

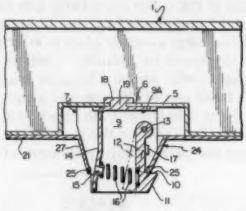
Akihiro Okada, Neyagawa, Japan, assignor to Itoki Kosakusho Co., Ltd., Joto, Japan

Filed Mar. 30, 1978, Ser. No. 891,810

Claims priority, application Japan, Aug. 31, 1977, 52-105139

Int. Cl.² A47B *17/00*

U.S. Cl. 312—194 **28 Claims**



1. A desk comprising:

a top board;

a plurality of mounting apertures located on an underside of the top board;

a plurality of top board supporting members;

a plurality of mounting parts located in each of the supporting members; and

a plurality of locking means, each locking means including a first portion adapted for attachment to a selected one of the top board mounting apertures and a second portion adapted to be inserted into a selected one of the supporting member mounting parts for mounting the top board to the

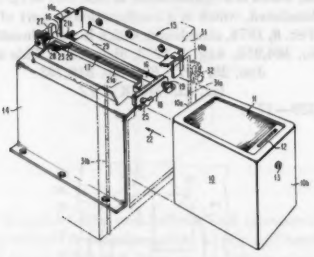
supporting members, said second portion comprising a detent having a hook-like protrusion at a lower end and being pivotally supported at an upper end and a spring biasing the detent to an outwardly extending position for engagement with the supporting member mounting parts.

4,186,977

SELF-LOCKING DEPOSITORY CONTAINER

Paul A. Gilovich, Saratoga, and John J. Lynott, Los Gatos, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 18, 1978, Ser. No. 952,436
Int. Cl.[2] E05B *65/46*; G07B *15/00*
U.S. Cl. 312—215 **9 Claims**



3. Apparatus for securing, in a predetermined location within a substantially stationary housing and controlling access to the interior of, a portable depository having a member that is normally locked closed, said apparatus comprising:

barrier means supported by the housing and rotatable between one position in which it permits insertion/removal of the depository into/from the housings, and another position in which it prevents such insertion/removal;

key means secured to said barrier means and insertable into the depository for unlocking the member to permit access to the interior of the depository only when said barrier means is in said other position;

means movable translationally and rotationally relative to said barrier means; and

means for selectively retaining the last-introduced means in one or the other of two rotative positions, in one of which it can move translationally one way and the opposite way for moving the member to access-providing and access-denying positions, respectively, and in another of which it is ineffective to do so.

4,186,978

TILT DOWN RECEPTACLE FOR REFRIGERATOR DOOR

Eugene F. Thomson, Evansville, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

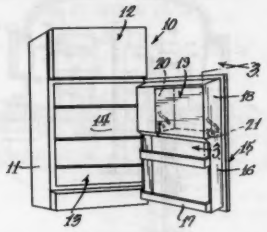
Filed Jul. 17, 1978, Ser. No. 925,418
Int. Cl.[2] A47F *3/00*; F25D *25/00*
U.S. Cl. 312—138 A **8 Claims**

1. In a refrigeration apparatus having wall means defining a refrigerated space, an opening to said space, and a door for selectively closing said opening, a receptacle in said space defining an access opening, and a lid pivotally mounted to said receptacle for selectively closing said receptacle opening, improved means for movably mounting said receptacle and lid in said space comprising:

mounting means for pivotally mounting said receptacle in said door for movement between a vertical retracted position therein and a horizontal access position projecting outwardly from the door with said access opening uppermost, said mounting means defining a horizontal pivot axis at the bottom of said receptacle when said receptacle is in said vertical position;

a follower pin carried by said lid and extending therefrom in a direction generally parallel to said pivot axis;

a guide carried by said door adjacent said follower for contacting and guiding the movement of said follower as an incident of movement of said receptacle, said guide having a first portion which is generally arcuate about said pivot



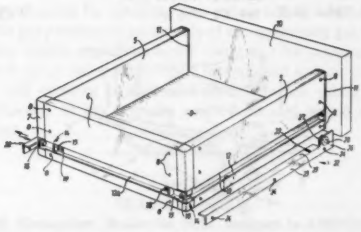
axis for guiding said follower as said receptacle is moved between said retracted position and an intermediate position such that said lid remains closed, and a second portion which extends away from said pivot axis for guiding said follower as said receptacle is moved between said intermediate position and said access position such that said lid is thereby moved to an open position providing access to said receptacle opening.

4,186,979

DRAWERS

Leon G. Litchfield, both of Derby, England, assignor to L. B. (Plastics) Limited, Derby, England

Filed Jul. 12, 1978, Ser. No. 923,795
Claims priority, application United Kingdom, Jul. 23, 1977, 31040/77
Int. Cl.[2] A47B *88/16*
U.S. Cl. 312—333 **18 Claims**



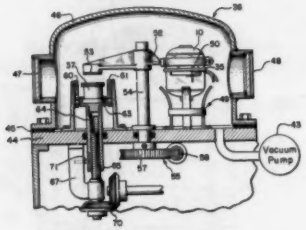
1. A drawer having a front wall, a rear wall and opposed side walls, longitudinal tracks formed in said side walls, and a pair of guide members mounted at the rear corners of the drawer and moveable between retracted positions in which the guide members are clear of the rear ends of the associated tracks and operative positions in which the guide members extend across the ends of the respective tracks, the guide members being adapted to engage with respective drawer runners mounted in a supporting structure in which the drawer is mounted in use to support and guide the rear end of the drawer on the runners, and each of said guide members including an actuating member to facilitate sliding movement of said guide member between said retracted and operative positions.

4,186,980

METHOD AND APPARATUS FOR CONSTRUCTING ELECTRONIC DEVICES

Adolph Wolski, Morton Grove, Ill., assignor to Ni-Tec, Inc., Niles, Ill.

Filed Jan. 3, 1966, Ser. No. 518,479
Int. Cl.[2] H01J *9/18*
U.S. Cl. 316—19 **5 Claims**



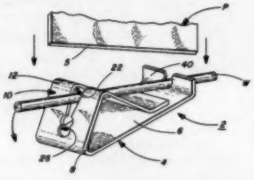
1. A method of contructing an electronic device comprising the following steps:
- processing at least a portion of a first component of said device in a first chamber having an environment free of contaminants harmful to the processed portion;
- locating a second component of said device in a second chamber, separated from said first chamber by a barrier, and having an environment which may contain said harmful contaminants;
- protectively covering said processed portion of said first component;
- breaking said barrier between said chambers;
- and removing said protective cover from said processed portion during assembly of said first and second components without substantially exposing said processed surface of said first component to said second environment.

4,186,981

GROUNDING DEVICE

Robert J. Holton, North Caldwell, N.J., assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 4, 1978, Ser. No. 930,969
Int. Cl.[2] H01R *3/04*
U.S. Cl. 339—14 R **7 Claims**



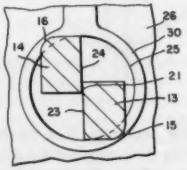
1. A grounding device for mounting an electrical element, such as a ground wire or the like, to a support member comprising a body having a base member, a resilient spring-arm integral with and extending outwardly from said base member, said spring-arm including a first inclined leg portion made integral with and extending angularly outwardly from one end of said base member and a second inclined leg portion made integral with and extending angularly inwardly from said first leg portion, said spring-arm having a slot disposed in said leg portions adapted for slidably receiving said electrical element and support member therein, and said spring-arm having projection means extending into said slot adapted for gripping engagement with the confronting surfaces of said support member for holding said electrical element in substantially aligned relation with a confronting edge of said support member in the installed position thereof, said second leg portion including an integral generally laterally extending flange portion, and said laterally extending flange portion being spaced from said base member and adapted for abutting movement toward and away from said base member upon mounting of said electrical element with said support member.

4,186,982

CONTACT WITH SPLIT PORTION FOR ENGAGEMENT WITH SUBSTRATE

Robert F. Cobaugh, Elizabethtown, and James R. Coller, Mechanicsburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 698,240, Jun. 21, 1976, abandoned, which is a continuation of Ser. No. 481,577, Jun. 21, 1974, abandoned, which is a continuation-in-part of Ser. No. 440,899, Feb. 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 384,852, Aug. 1, 1973, abandoned. This application Jun. 28, 1977, Ser. No. 810,703
Int. Cl.[2] H05K *1/12*
U.S. Cl. 339—17 C **38 Claims**



1. A contact for insertion into an aperture extending between upper and lower surfaces of a substrate comprising:
- a pair of offset legs extending along a longitudinal axis adapted to extend at least part way through said aperture and to tightly engage the peripheral surface of said aperture;
- said legs being joined at their ends for compliant movement throughout their offset lengths relative to each other in a first direction substantially normal to said axis during insertion into said aperture so as to reduce their combined cross-sectional dimension thus permitting accommodation by said aperture;
- said legs being in a mutually touching relationship for a majority of the distance they extend into said aperture along longitudinally extending friction surface means in a plane constructed between said legs upon completion of insertion of said legs to their final position of stable support within said aperture;
- said plane being so constructed that the maximum combined cross-sectional dimension of said legs is reduced during insertion into said aperture without causing any increase in the combined cross-sectional dimension of said legs in a direction perpendicular to said plane; and
- said friction surface means resisting said compliant movement of said legs relative to each other in said first direction.

4,186,983

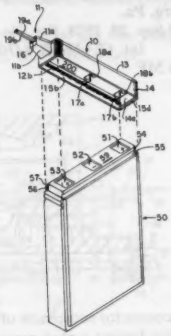
BATTERY CONNECTOR

Gordon E. Kaye, Garrison, N.Y., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Filed Oct. 30, 1978, Ser. No. 956,130
Int. Cl.[2] H01M *2/20;* **H01R** *13/54*
U.S. Cl. 339—91 R **9 Claims**

1. A connector, adapted to be connected to a battery having substantially planar terminals on a wall thereof and to an electrical device to provide electrical connection between said electrical device and said battery; said connector comprises a

housing and conductive means adapted to electrically contact said battery terminals and said electrical device, said conductive means being partially contained within said housing and partially extending from said housing for electrical connection to said electrical device and said conductive means further partially extending from said housing at a region of said housing adapted to be directly adjacent said battery wall when said



connector is connected to said battery, said connector further comprising resilient connection means to grip said battery, said connection means extending from the periphery of said housing region with said connection means being adapted to snap over said battery wall and cooperatively grip corresponding holding means on said battery with said holding means being located adjacent to the periphery of said battery wall.

4,186,984

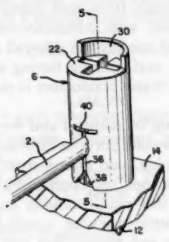
STRAIN RELIEF COVER FOR A BARREL TERMINAL

Robert P. Reavis, Jr., Statesville; Melvin A. Soderstrom, Advance, and Vasantrai A. Vachhani, Kernersville, all of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 857,068, Dec. 5, 1977, Pat. No. 4,141,618. This application May 5, 1978, Ser. No. 903,367

Int. Cl.[2] H01R *13/58*

U.S. Cl. 339—103 R **2 Claims**



1. A wire inserter and strain relief cover for a slotted barrel terminal comprising:

a sleeve of dielectric material having a closed end and an open end,

said closed end including a pair of intersecting recesses,

said sleeve having a lengthwise wire receiving slot communicating with said open end and extending toward said closed end and terminating in a transverse slot,

said wire receiving slot having an enlarged flared entryway communicating with said sleeve open end, and

a projecting portion on said closed end internally of said sleeve and concentric therewith, whereby said projecting portion engages a wire entering into said wire receiving slot and into an open end of a slot provided longitudinally in a barrel terminal which is to be covered by said cover.

4,186,985

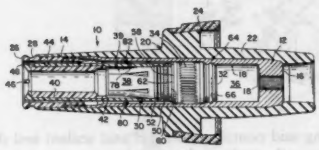
ELECTRICAL CONNECTOR

Frank M. Stepniak, Long Valley, and Andrew A. Kominiak, Flanders, both of N.J., assignors to Amerace Corporation, New York, N.Y.

Filed Aug. 29, 1978, Ser. No. 937,737

Int. Cl.[2] H01R *13/52*

U.S. Cl. 339—111 **19 Claims**



1. A female electrical connector for use in separably connecting a male contact element with an energized high voltage circuit, said connector comprising a rigid conductive housing having a first end adapted to receive said male contact element, a second end adapted to be substantially closed and an internal wall surface providing an axially extending opening therebetween, an elongate female contact assembly including a tubular piston of conductive material within and in electrically conductive relationship with said housing and axially movable between a first position wherein said piston is maximally spaced from said first housing end and a second position wherein said piston is minimally spaced from said first housing end, said piston providing said connector with a chamber adjacent said second housing end, and female contact means for engaging said male contact element, said female contact means being carried by and movable with and in electrically conductive relationship with said piston, said female contact assembly being configured to transmit to said chamber arc-quenching gas which is generated in response to an arc being struck between said male contact element and said female contact means as said male contact element approaches said female contact means, said connector further comprising a latch mechanism for retaining said piston in said first position until the gas pressure of such evolved arc-quenching gas in said chamber attains a predetermined value and for releasing said piston to cause the same to move toward said second position when said pressure exceeds said predetermined value, under the influence of gas pressure exerted on said piston in said chamber.

4,186,986

SEALED SPLICE

John R. Shoemaker, Reidsville, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 16, 1978, Ser. No. 961,302

Int. Cl.[2] H01R *3/02*

U.S. Cl. 339—114 **4 Claims**

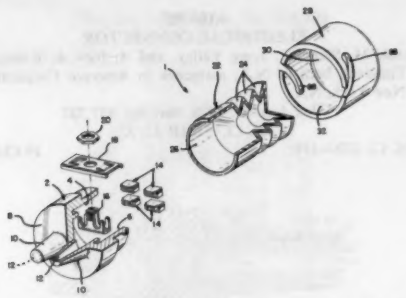
1. A connector having an interior which is self-sealing by distribution of sealant material, comprising:

a connector shell having an interior cavity and wire receiving openings through the exterior of said shell which communicates with said cavity,

said cavity having a wire receiving section for receiving a plurality of wires passing through said openings to be electrically joined within said cavity,

said cavity having another section containing a volumetrically collapsable container filled with a fluid sealant material, and

means for closing said connector shell compressibly over said wires and said container and for volumetrically collapsing said container to expel said sealant and distribute the same throughout the cavity.

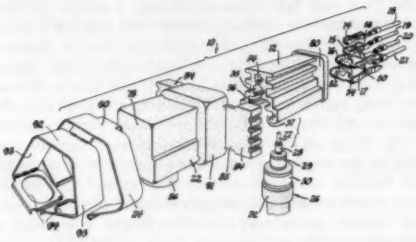


4,186,987

ELECTRICAL SOCKET CONNECTOR AND TERMINAL THEREFOR

Warren Pearce, Jr., Warren, and Charles W. Ramsey, Niles, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 23, 1978, Ser. No. 953,412
Int. Cl.[2] H01R 9/12
U.S. Cl. 339—116 C **6 Claims**



1. An electrical socket connector for a post terminal having axially arranged multiple contacts comprising:

a molded one-piece connector body having a plurality of longitudinal cavities extending therethrough and defining openings at its front and rear ends,

said connector body having a pair of exterior longitudinal walls and a partition wall between each adjacent pair of cavities,

one of said exterior walls and each partition wall having a longitudinal slot extending therethrough which is open at the front end of the connector body, said longitudinal slots being in vertical alignment to receive a post terminal and dispose a portion thereof in each longitudinal cavity,

a terminal disposed in each of said cavities, each terminal having a channel-shaped contact portion at one end and an attachment portion at an opposite end secured to a lead wire and being longitudinally insertable into its associated cavity via the opening at the rear end of the connector body,

each said contact portion comprising a pair of side rails connected by forward and rearward webs longitudinally spaced from each other,

said forward web spanning an associated one of said longitudinal slots adjacent the opening at the front end of the connector body, and

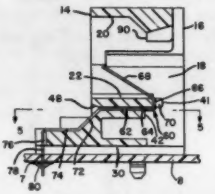
said side rails having central portions between the webs which are displaced toward each other and project over the associated slot for engaging a portion of a post terminal when the post terminal is inserted into the connector body via the vertically aligned longitudinal slots.

4,186,988

ELECTRICAL CONNECTOR RECEPTACLES

Robert J. Kobler, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 20, 1978, Ser. No. 944,095
Int. Cl.[2] H05K 1/10
U.S. Cl. 339—176 MP **6 Claims**



1. An electrical connector receptacle of the type comprising an insulating housing having a plug-receiving end and a rearward end, a plug-receiving opening extending into said plug-receiving end, said plug-receiving opening having opposed internal sidewalls and opposed internal endwalls, said housing having oppositely directed external sidewalls and oppositely directed external endwalls, a plurality of electrical conductors in side-by-side spaced-apart relationship, each of said conductors comprising a contact spring portion extending from one of said internal sidewalls at a location adjacent to said plug-receiving end diagonally into said opening and towards the opposite internal sidewall, and each conductor having a lead portion extending from said plug-receiving end through said housing between said one internal sidewall and the adjacent external sidewall and towards said rearward end, said plug-receiving opening being dimensioned to receive a connector plug having spaced apart contact members therein which engage said contact spring portions of said conductors, said connector receptable being characterized in that:

said housing has a single conductor-receiving opening extending therethrough from said rearward end to said plug-receiving end, said conductor-receiving opening being between said one internal sidewall and said adjacent external sidewall, said opening having a width which is sufficient to receive said conductors in side-by-side coplanar relationship,

said conductors being of stamped and formed sheet metal and having intermediate portions disposed in said conductor-receiving opening, said intermediate portions constituting said lead portions, said conductors having reversely bent portions at said plug-receiving end which extend from said conductor-receiving opening to said plug-receiving opening and having first end portions which extend into said plug-receiving opening, said first end portions constituting said contact spring portions,

each of said conductors having a second end portion which extends beyond said rearward end,

said housing having an apron extending from said rearward end between said conductor-receiving opening and said adjacent external sidewall, said conductors extending across said apron, and

conductor positioning and retaining means on said apron, said conductor positioning and retaining means being effective to secure said second end portions of said conductors against lateral movement towards each other whereby,

said intermediate portions, said reversely bent portions, and said first end portions of said conductors are maintained in

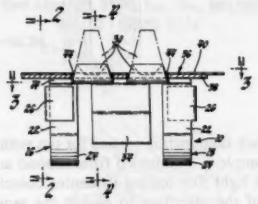
spaced-apart relationship at predetermined locations in said conductor-receiving opening and said plug-receiving opening.

4,186,989

FEMALE TERMINAL FOR PRINTED CIRCUITS

Andrew F. Rodondi, Sharpsville, Pa., and Alfred V. Rossi, Cortland, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 13, 1978, Ser. No. 960,581
Int. Cl.[2] H01R *13/12*
U.S. Cl. 339—258 R **2 Claims**



1. In a unitary sheet metal female terminal having a pair of lateral mounting flanges adapted for attaching the mounting flanges to a flexible printed circuit and a resilient, laterally spreadable female contact portion joined to laterally spaced, longitudinal edge portions of the respective mounting flanges; the improvement comprising:

said laterally spaced mounting flanges having adjacent longitudinal end edge portions which are laterally spaced from the longitudinal edge portions joined to the female contact portion, and

a pair of longitudinally spaced upright posts joined to the longitudinal end edge portions,

each post comprising a pair of flat leg portions joined to a respective mounting flange and clamped together adjacent the mounting flanges by an integral tab of one of said leg portions which is wrapped over the other of said leg portions to prevent the mounting flanges from spreading apart when the female contact portion is laterally spread upon receipt of a mating blade terminal therein.

4,186,990

LEAD SOCKET INSERT

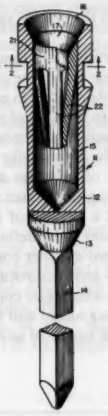
Guido Bertoglio, Viganello, Switzerland, assignor to Augat Inc., Attleboro, Mass.

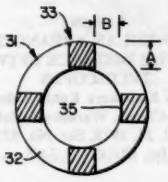
Filed Jul. 19, 1978, Ser. No. 926,227
Int. Cl.[2] H01R *13/12*
U.S. Cl. 339—258 R **15 Claims**

1. A socket contact comprising:

an elongated sleeve member formed with an internal bore opening into one end and a projection adapted for electrical interconnection by means such as soldering or wire wrapping extending from the other end, said bore being blind at one end and having a tapered entry at the open end; and

a machined insert within said bore, said insert having a hollow body portion of generally cylindrical configuration with a tapered entry at one end aligned with and forming a continuation of said bore tapered entry, said body being integrally formed with a plurality of flexible fingers at the other end, each of said fingers having a substantially flat inner surface, said fingers being bent and biased inwardly at their point of connection with said body toward the axis of said insert thereby providing a converging configuration, said converging fingers being





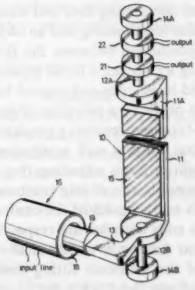
adapted to receive and frictionally engage an electrical component lead therebetween.

4,186,991

ANGULARLY ROTATABLE MIRROR APPARATUS

Hiroshi Koide, Sagamihara; Junichi Watanabe, Kawasaki, and Shigemoto Tenmyo, Tokyo, all of Japan, assignors to Ricoh Co., Ltd., Japan

Filed Jun. 27, 1978, Ser. No. 919,630
Claims priority, application Japan, Jun. 30, 1977, 52-78261
Int. Cl.[2] G02B *23/00*
U.S. Cl. 350—6.91 **6 Claims**



1. An angularly rotatable mirror apparatus comprising:

a bracket including an elongated mirror support portion;

a rotary shaft extending from opposite ends of said bracket and having a single axis;

a planar mirror attached to said mirror support and having a reflective surface;

arm means extending from the bracket in a plane perpendicular to the rotary shaft;

linear motor means for driving said bracket to pivot the same about said axis, said linear motor means comprising first and second members movable relative to each other along a path substantially tangential to the path of movement of the outer end of said arm means, said first member comprising a center pole extending generally tangentially to the path of movement of the outer end of said arm means, an outer yoke extending generally along the center pole and at least partially enclosing at least a portion of said center pole, said center pole and said outer yoke defining an elongated gap therebetween, said second member comprising a cylindrical coil located in said gap and reciprocably movable substantially in the direction in which said center pole extends; and

means for rigidly connecting one of said first and second members of said linear motor means to said arm means.

4,186,992

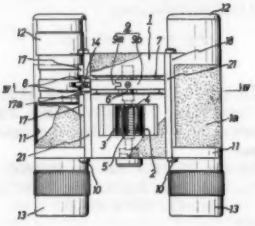
BINOCULAR WITH AN ARRANGEMENT FOR ADJUSTING THE DISTANCE BETWEEN TWO TELESCOPES

Ichiro Kamakura, c/o Kamakura Kohki Kabushiki Kaisha, No. 6-12, Tsukagoshi 3-Chome, Warabi-shi, Saitama-Ken, Japan

Filed Jul. 24, 1978, Ser. No. 927,523

Int. Cl.[2] G02B *7/06*

U.S. Cl. 350—36 **2 Claims**



1. A binocular, comprising first and second telescopes each including an ocular lens housing and an objective lens housing; a central body positioned between the first and second telescopes and having a channel; a focus adjusting ring built in the central body, said telescopes and central body being rotatably linked with each other by a plurality of screw-type pins each engaging screw-type pin receiving portions disposed on both sides of the central body as well as adjacent each end of each telescope, the built-in focus adjusting ring including a sliding pin engaged therewith, the sliding pin being fixed with a bar accommodated is said channel of the central body and including two opposite ends both having respective bifurcate fitting members, said bar having a width smaller than that of said channel, each of the bifurcate fitting members being freely fitted with a feed pin fixed with the objective lens housing, whereby by rotating the built-in focus adjusting ring, the sliding pin and the bar are moved back and forth so that consequently the objective lens housing fixed with the feed pin is moved back and forth.

4,186,993

EPIDARK ILLUMINATION SYSTEM

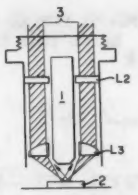
Yoshiyuki Shimizu, and Takeshi Sudo, both of Kawasaki, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Sep. 22, 1977, Ser. No. 835,786

Claims priority, application Japan, Sep. 30, 1976, 51/130525[U]

Int. Cl.[2] G02B *21/10*

U.S. Cl. 350—91 **3 Claims**



1. An epidark illumination system for use with a microscope in which a sample is illuminated from around an objective by a ring-shaped light flux having its center coincident with the optical axis of the objective to enable the sample to be observed in a dark field of view, said system comprising;

a ring-shaped condenser lens member disposed adjacent to the forward end of said objective with the center of said lens member being coincident with the optical axis of said objective to condense said light flux upon the sample; and

a ring-shaped transparent scattering member for scattering said ring-shaped light flux in the light pass upstream of said ring-shaped condenser lens member and located at a position between the middle of the length of the lens barrel of the objective and the vicinity of the portion thereof attached to the body of the microscope.

4,186,994

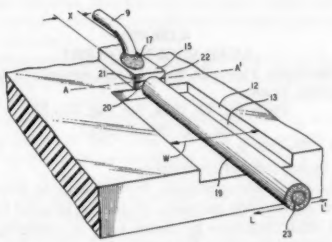
ARRANGEMENT FOR COUPLING BETWEEN AN ELECTROOPTIC DEVICE AND AN OPTICAL FIBER

Nathan M. Denkin, Aberdeen, and Peter K. Runge, Fair Haven, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 21, 1978, Ser. No. 898,926

Int. Cl.[2] G02B *5/14*

U.S. Cl. 350—96.17 **7 Claims**



1. Apparatus for coupling an electrooptical device to an optical fiber including

a header (**10**) having a plateau (**11**) and a trough (**12**) with a flat bottom (**13**) disposed adjacent to said plateau and characterized in that the depth (D) of said trough is configured so that when a light emitter (**15**) is mounted on said plateau and the fiber (**19**) is fully inserted with a portion of said fiber's circumference in direct contact with the flat bottom of said trough, the center of the light guiding core of said fiber lies in a plane (A-A') of maxi-

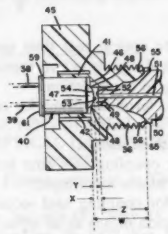
mum light emission, said plane being parallel to the trough bottom and passing through the point of maximum light emission within the emitting region (22) of said emitter, and the width (W) of said trough being substantially greater than both the width (X) of said emitter and the diameter of said fiber to permit lateral displacement of said fiber.

4,186,995

LIGHT DEVICE, LENS, AND FIBER OPTIC PACKAGE

William L. Schumacher, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 30, 1978, Ser. No. 891,793
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.20 **3 Claims**



1. In an assembly for coupling a photoelectric element and an optical fiber, the improvement comprising:

a single piece coupling body of molded insulation material having a first cavity concentrically receiving a first subassembly of a radially resilient ferrule secured concentrically over an end portion of an optical fiber,

said body including a second cavity opening into said first cavity and receiving a second subassembly of a photoelectric element and a lens,

said second cavity containing a plurality of partitions integrally molded with said body and constructed for frictional encirclement of said second subassembly, and

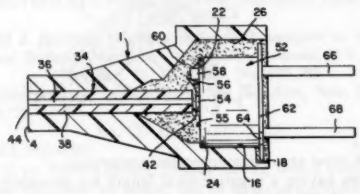
said body having a rigid section encircling said partitions and constructed to define a clearance receiving flexure of said partitions toward and away from said rigid section.

4,186,996

OPTIC ADAPTOR JUNCTION

Terry P. Bowen, Etters, and Leonard F. Bendiksen, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 22, 1978, Ser. No. 944,937
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.20 **6 Claims**



1. A coupling connector for connecting between an optic waveguide transmission line and an optoelectronic circuit device, comprising:

a ferrule of resilient material provided with a cylindrical end having a concentric bore therein,

an opposite end of said ferrule provided with a cylindrical end communicating with said bore and being adapted for receiving an optoelectronic circuit element,

a length of optic waveguide mounted in said bore and having a polished first end substantially flush with said cylindrical end of said ferrule,

a polished second end of said waveguide projecting into said cavity at a precise location within said cavity,

first means for seating and positioning an optoelectronic circuit element at a precise location in said cavity, and

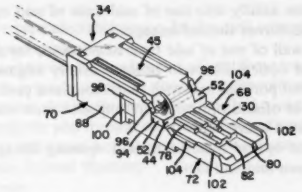
second means for bonding said optoelectronic device and said waveguide in said bore .

4,186,997

OVERLAP TYPE WAVEGUIDE CONNECTOR ASSEMBLY AND METHOD

William L. Schumacher, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 14, 1977, Ser. No. 768,512
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.21 **16 Claims**



1. In an optical waveguide overlap connector, the improvement comprising:

a pair of optical waveguides mounted in a pair of intermateable rigid connector bodies having identical mating faces which are provided with rigid grooves receiving therein said optical waveguides, said mating faces abuttingly cooperating to bring said grooves into mutual alignment enclosing said optical waveguides,

pads of resilient compressible material initially projecting from mounted positions recessed within said mating faces, said pads being provided with grooves which are colinear with the rigid grooves of said mating faces and which initially receive therein corresponding end portions of said optical waveguides, and

said pads being resiliently compressed together sealably surrounding said waveguide end portions upon cooperation of said mating faces, and said pads being yieldably compressed into enclosing relation with said end portions of said waveguides colinearally aligning the central axes thereof.

4,186,998

OPTICAL INTERCONNECTING DEVICE HAVING TAPERED SURFACES

Melvyn A. Holzman, Boulder, Colo., assignor to The Deutsch Company Electronic Components Division, Banning, Calif.

Filed Jun. 14, 1978, Ser. No. 915,462
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.21 **17 Claims**

9. An optical fiber connector comprising

a duality of optical fibers,

each of said optical fibers having a central core, a cladding around said core defining a cylindrical outer surface, a substantially flat end face perpendicular to the axis thereof, and a corner between said end face and said outer surface,

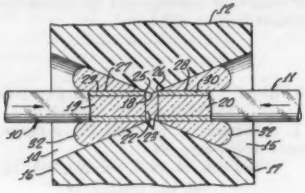
a member having an opening therethrough,

said opening having two outer ends, an intermediate portion of relatively small lateral dimension, and two axially

aligned tapered portions positioned one on either side of said intermediate portion,

each of said tapered portions being defined by a wall tapering inwardly toward said intermediate portion, said intermediate portion of said opening having a diameter which is less than that of said outer surfaces of said fibers and greater than that of said cores of said fibers,

means for engaging each of said optical fibers for pressing the



same axially into one of said ends of said openings so that said corner thereof engages

said wall of one of said tapered portions, for thereby causing said optical fibers to become axially aligned with said tapered portions and with each other, and positioning said end faces of said optical fibers opposite each other and closely spaced apart,

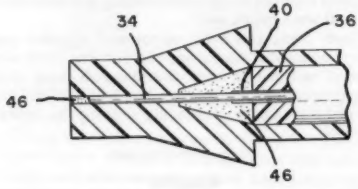
and an optical material in said opening filling the space between said end faces.

4,186,999

CONNECTOR FERRULE FOR TERMINATING OPTICAL FIBER CABLES

Robert G. Harwood, Mechanicsburg, and Terry P. Bowen, Etters, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 25, 1977, Ser. No. 844,869
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.21 **16 Claims**



1. An improved ferrule member for a fiber optics cable connector, each connector having a housing member with at least one ferrule receiving cavity therein and means to secure a ferrule member in each said cavity, said ferrule member comprising:

a body having a profiled passage extending therethrough from a cable receiving rear portion to a bore of sufficient size to allow only the passage of an unclad optical fiber core therethrough,

an optic cable having a light transmitting core projecting from a light refracting cladding,

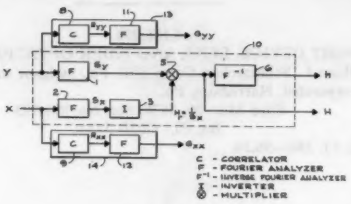
at least that portion of the ferrule body defining said passage being formed of a material having an index of refraction approximating that of said cladding and snuggly encircling said projecting core inserted in said passage.

4,187,000

ADDRESSABLE OPTICAL COMPUTER AND FILTER

James N. Constant, 1603 Danbury Dr., Claremont, Calif. 91711

Continuation-in-part of Ser. No. 587,323, Jun. 16, 1975, abandoned. This application Dec. 15, 1977, Ser. No. 860,725
Int. Cl.[2] G06G 9/00
U.S. Cl. 350—162 SF **54 Claims**



1. A system for optical real time analog computation by manipulating optical signals in two spatial dimensions simultaneously, including in combination:

first and second terminal means for coupling beam signals, respectively, as inputs;

optical computation means;

first means for coupling said first terminal means to said computation means as an input;

second means for coupling said second terminal means to said computation means as an input;

said computation means having the outputs of said first and second coupling means as inputs and providing a mathematical relationship of its inputs, as an output,

said computation means including at least one spatial light modulator (SLM) for recording first input images and for reproducing output images when illuminated by second input images,

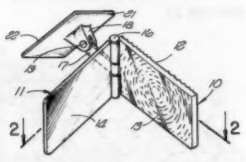
said SLM including a free carrier source for recording and reproducing optical images by forming charges in potential wells created by applying voltages to electrodes in said free carrier source.

4,187,001

VIEW EXPANDING APPARATUS

Robert F. Redwitz, S. Laguna, and William G. Baker, Rolling Hills Estates, both of Calif., assignors to Redwitz Baker Incorporated, Irvine, Calif.

Continuation-in-part of Ser. No. 758,216, Jan. 10, 1977, abandoned. This application Nov. 7, 1977, Ser. No. 848,833
Int. Cl.[2] G02B 17/00
U.S. Cl. 350—202 **18 Claims**



1. A view expanding apparatus comprising:

a lens having a negative focal length for providing an expanded field of view,

a mirror secured to one edge of said lens and angularly displaced therefrom, said mirror having a reflecting surface for reflecting the expanded field of view,

arm members including means for mounting said apparatus on a surface, and

a pin, said lens, said mirror and said arm members being secured to said pin for pivoting relative to each other

about said pin, said securing providing adjustability of said angular displacement.

5. A system for expanding the side and rear view of a vehicle driver comprising:

a lens having a negative focal length for providing an expanded side and rear view,

a mirror having a reflecting surface for reflecting the expanded view in the direction of the driver to enable the driver to observe the expanded view,

securing means for securing one edge of said lens to one edge of said mirror at an angular displacement therefrom,

arm members connected to said securing means for mounting said system to the interior of the windshield of the vehicle,

said securing means including pin means, said lens, said mirror and said arm members being secured to said pin means for pivoting relative to each other about said pin means, said securing providing adjustability of said angular displacement.

4,187,002

FILM FOR CORRECTING SPATIAL IRREGULARITY IN THE GAIN OF OPTICAL IMAGES OF INTENSIFIER TUBES

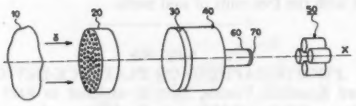
Guy Roziere, Paris, France, assignor to Thomson-CSF, Paris, France

Continuation of Ser. No. 688,611, May 21, 1976, abandoned. This application Oct. 28, 1977, Ser. No. 846,581

Claims priority, application France, May 21, 1975, 75 16406

Int. Cl.[2] G02B *5/22*; H01J *31/50*

U.S. Cl. 350—314 **9 Claims**



1. A film for correcting spatial irregularity in the gain of luminescent screen optical images, in combination with said screen in the path of the optical images from said screen, characterised in that said film surface is comprised of a plurality of elementary zones, each one of which exhibits a constant average transparency different from other zones and at least some of which are surrounded by other elementary zones and are made of opaque parts separated by transparent parts.

4,187,003

ELECTROLYTE FOR ELECTROCHROMIC DISPLAY DEVICE

Donald J. Barclay, Winchester, England, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 21, 1978, Ser. No. 935,399

Claims priority, application United Kingdom, Nov. 2, 1977, 45500/77

Int. Cl.[2] G02F *1/17, 1/23*

U.S. Cl. 350—357 **7 Claims**

1. In an electrochromic display device which comprises a display electrode, an anode, and an aqueous electrolyte solution disposed therebetween which produces a display effect by electrodeposition of a colored species from the electrolyte onto the display electrode as a result of a redox reaction, the improvement according to which the electrolyte comprises an anion which is either hypophosphite or phosphite and a cation which has a bipyridinium structure.

4,187,004

NEGATIVE TYPE DISPLAY IN ELECTROCHROMIC DISPLAY DEVICE

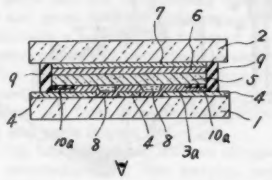
Kohzo Yano, Tenri; Tadanori Hishida, Kashihara; Yasuhiko Inami, Tenri, and Tomio Wada, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 25, 1978, Ser. No. 872,315

Claims priority, application Japan, Jan. 28, 1977, 52-9055; Aug. 16, 1977, 52-99747

Int. Cl.[2] G02F *1/17*

U.S. Cl. 350—357 **11 Claims**



1. A negative type electrochromic display cell comprising:

a front transparent substrate;

a transparent electrode means formed on said front transport substrate to provide a desired display configuration;

a first continuous electrochromic layer overlying said transparent electrode and formed on the portions of said front transparent substrate not having said transparent electrode means formed thereon;

a rear substrate;

a counter electrode formed on said rear substrate;

a second electrochromic layer formed on said counter electrode;

a background creating member disposed between said first and said second electrochromic layers, said background creating member exhibiting a color sensation which is different from the coloration state exhibited by said electrochromic layers; and

an electrolyte impregnated into said background creating member.

4,187,005

MICROSCOPE SUPPORT SYSTEM FOR USE IN EXAMINING EYES IN VIVO AND ENUCLEATED

Harold E. Rosenberger, Rochester, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Oct. 20, 1978, Ser. No. 953,231

Int. Cl.[2] A61B *3/00*

U.S. Cl. 351—38 **8 Claims**

1. A system for supporting and positioning a microscope to permit both the examination of the cornea of an eye in vivo and the examination of an enucleated eye with the same optical and illumination systems, said optical system including a corneal contact element, said system comprising:

(a) a head rest mechanism for supporting and positioning a head to thereby position an eye in vivo in a fixed location;

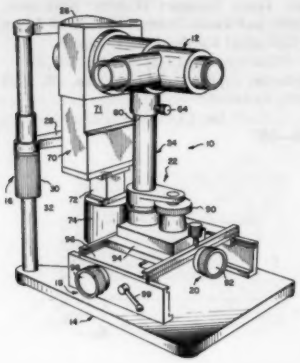
(b) a first means for supporting and positioning said microscope relative to said head rest mechanism, said first means including means for moving said microscope toward and away from said head rest mechanism to thereby permit said corneal contact element to be brought into and out of contact with the cornea of an eye in vivo;

(c) means for supporting an enucleated eye in a substantially horizontal plane;

(d) a second means for supporting and positioning said microscope relative to said enucleated eye support; and

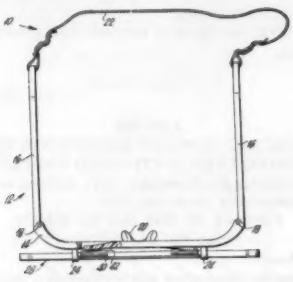
(e) means for varying the relative distance between said

microscope and said enucleated eye support to thereby permit said corneal contact element to be brought into and



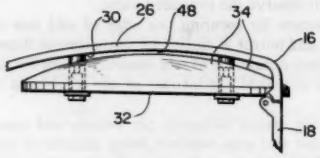
out of contact with the cornea of an enucleated eye for microscopic examination thereof.

4,187,006
FLIP-DOWN SUNGLASSES
Saul Neidell, Fairlawn, N.J., assignor to Premier Athletic Products Corp., East Rutherford, N.J.
Filed Jul. 26, 1978, Ser. No. 927,955
Int. Cl.[2] G02C *13/00*
U.S. Cl. 351—44 **7 Claims**



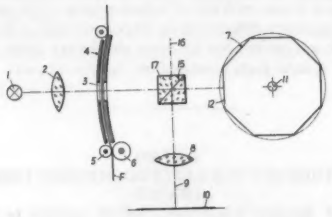
1. Sunglasses comprising a fixed part, means for attaching said fixed part to a wearer above said wearer's eyes, a moveable part pivotably joined to said fixed part, said moveable part including means for attenuating sunlight, said moveable part having a first position in which said sun attenuating means are positioned outwardly from said wearer so that said sun attenuating means are not positioned over the wearer's eyes, said moveable part having a second position in which said sun attenuating means are positioned over said wearer's eyes, said fixed part having at least one flexible arm disposed thereon, the longitudinal axis of said flexible arm extending parallel to the longitudinal axis of said fixed part, rib means disposed on at least one of said flexible arm and said moveable parts, and groove means for engagement with said rib means disposed on the other of said flexible arm and said moveable part, said rib and groove means releasably securing said moveable part of said first and said second positions.

4,187,007
EYEGLASS CONSTRUCTION
John R. Lauffer, Seekonk, Mass., assignor to Martin-Copeland Company, East Providence, R.I.
Filed Sep. 18, 1978, Ser. No. 944,659
Int. Cl.[2] G02C *1/04*
U.S. Cl. 351—108 **3 Claims**



1. An eyeglass construction including in combination a frame having a generally laterally extending eyebrow bar, at least one lens having a relatively pronounced convex curved outer face and a rear face having a peripheral edge defining a substantially flat plane, and means affixing said outer lens face to said bar at spaced portions adjacent the top peripheral edge of said lens so as to suspend said lens from said bar, said means comprising openings extending through said lens at said spaced portions, said openings extending substantially perpendicular to said rear flat plane, a pair of posts operatively associated with said bar and extending at least partially through said lens openings, a bushing mounted on each post and positioned between said brow bar and said other lens face, said bushing being of sufficient length so as to maintain the entire top peripheral portion of said outer lens face in spaced relation to said bar and at the same time maintain said rear flat plane in substantially straight downward disposition no matter what curvature exists in said outer lens face, and fastening means in engagement with the free ends of said posts.

4,187,008
PHOTOGRAPHING OR PLAYBACK-DEVICE
Eduard Keznickl, Vienna, Austria, assignor to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria
Filed Mar. 12, 1979, Ser. No. 19,540
Claims priority, application Austria, Mar. 23, 1978, 2068/78
Int. Cl.[2] G03B *41/06*
U.S. Cl. 352—108 **5 Claims**



1. In a photographing- or playback- device for a continuous photo picture carrier which is moved along a guide track by means of a drive device, particularly for motion picture film, with an optical imaging system and at least one mirrored surface which is movable about a mirror axis, particularly a polygonal set of mirrors for the optical equalization of the image migration as well as a light source if necessary, the improvement further comprising

a partially-mirrored surface disposed in the optical path between the guide track of the picture carrier and the at least one mirrored surface, a ray axis being defined runing between the guide track and said at least one mirrored surface,

said partially-mirrored surface is inclined relative to the optical path and forms a part of an autocollimation system, the latter including the optical imaging system,

said partially-mirrored surface constituting means for deflecting a part of the rays,

the axis of the optical imaging system being transverse relative to the ray axis and running to, and respectively from, said partially-mirrored surface,

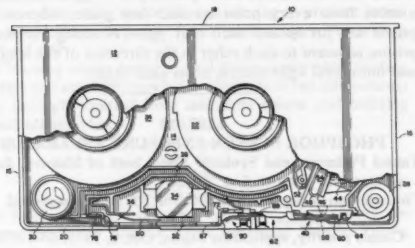
the mirror axis of the at least one mirrored surface being aligned with said ray axis.

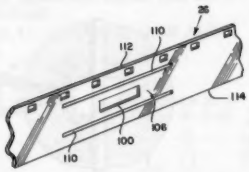
4,187,009

SLIDE VALVE DISPLACING ARRANGEMENT FOR MULTIPURPOSE CASSETTE

Joseph A. Stella, Peabody, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 2, 1979, Ser. No. 157
Int. Cl.² G03C *11/00*
U.S. Cl. 352—130 **3 Claims**





1. A motion picture film handling cassette for use with other apparatus for first exposing a strip of photographic film material and then treating the film strip with processing fluid to develop viewable images on the film strip, said cassette comprising:

a strip of photographic material;

a housing for retaining said film strip, said housing including an opening for exposing progressive incremental sections of said film strip;

means responsive to drive means of said other apparatus for advancing said film strip in a given path within said housing, said given path traversing said opening;

a pressure plate located within said housing at said opening, said pressure plate being configured to engage and support a length of one side of said film strip so as to support progressive incremental sections of said film strip passing thereby in a given focal plane;

film processing means for depositing a layer of processing fluid on said one side of said film strip following exposure thereof, including a nozzle opening configured for releasing said fluid;

selectively operable means for disabling said film processing means following deposit of said fluid layer, said means for disabling comprising a valve member configured for movement responsive to film strip advancement in a given direction between a first position along said film path at a location between said pressure plate and said nozzle opening and a second position wherein said valve is in blocking engagement with said nozzle opening, said valve including a pair of parallel spaced apart film strip guiding fingers located immediately adjacent the end of said pressure plate nearest said slide valve and configured to engage respectively the margins of the opposite side of said film strip from that engaged by said pressure plate, said spaced fingers being positioned with respect to said pressure plate so as to guide said film strip from said given focal plane defined by said pressure plate to a second plane substantially parallel to and spaced from said focal plane to thereby guide said film strip passing from said pressure plate, in said given direction, into engagement with said fingers through a substantially S-shaped path, said slide valve further including a third finger located between said spaced film guiding fingers and extending from said slide valve toward said pressure plate and lying in a plane intermediate said focal plane and said second plane defined by said guide fingers; and

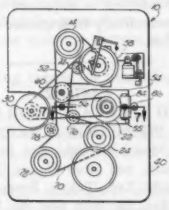
said film strip being provided with an elongated aperture therein intermediate said film margins, said elongated aperture being at least as wide as said third finger carried by said slide valve, said film strip further including a pair of elongated through slits therein extending on opposite lateral sides of and beyond the longitudinal extremities of said centrally disposed aperture, said slits being spaced from one another a distance less than the spacing between said pair of parallel spaced film engaging fingers carried by said slide valve, said centrally disposed aperture and the accompanying film strip slits being positioned along the length of said film strip at a location such that said aperture will approach said S-shaped path substantially simultaneous with completion of deposition of processing fluid upon the usable length of film strip, said elongated slits resulting in the portion of said film strip lying between said slits, which portion includes said elongated aperture, following a substantially straight path from said focal plane to said second plane defined by said pair of spaced film guiding fingers of said slide valve thereby resulting in the engagement of said third finger with said film strip aperture as said film strip is advanced thereby and, further, wherein continued advancement of said film strip in said given direction will result in positive displacement of said slide valve to its said second position.

4,187,010

FRAME POSITIONING APPARATUS

Charles G. Ajar, 4265 Clybourn Ave., North Hollywood, Calif. 91602

Filed Sep. 30, 1977, Ser. No. 838,423
Int. Cl.² G03B *21/46*
U.S. Cl. 352—162 **3 Claims**



1. In a motion picture projector having a film gate, upper and lower sprockets relative to said film gate, a mechanism for intermittently pulling down said film through said gate and a means for having each film frame centered within said gate at the completion of each intermittent pull-down cycle, the improvement according to which said centering means comprises:

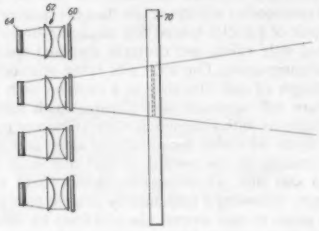
a plate having first and second opposite sides;
said intermittent pull-down mechanism having film engaging portions mounted on the first side of said plate and a first pulley connected thereto on the second side of said plate;
a belt for driving said first pulley;
a drive pulley located off one end of said plate for driving said belt;
a pivot for said plate aligned with and between said drive pulley and said first pulley; and
means for rotating said plate about said pivot so that said pull-down mechanism is moved relative to said gate whereby centering of said frames can be adjusted.

4,187,011

ARRANGEMENT FOR APPLYING CODED ILLUMINATED PATTERNS TO AN OBJECT

Paul L. Di Matteo, Melville; Joseph A. Ross, Fort Salonga; Howard K. Stern, Greenlawn, and Lawrence Waszak, Coram, all of N.Y., assignors to Solid Photography Inc., Melville, N.Y.

Continuation-in-part of Ser. No. 608,265, Aug. 27, 1975. This application May 8, 1978, Ser. No. 903,769
Int. Cl.[2] G03B *21/02*; G01B *11/24*
U.S. Cl. 353—122 **12 Claims**



1. An arrangement for projecting a sequence of coded patterns onto an object surface, comprising: a plurality of stationary masks each carrying a predetermined coded pattern of at least one line for forming parallel bands to be projected in sequence, the coded pattern being projected onto the object surface by passing electromagnetic radiation through the mask; a plurality of sources of electromagnetic radiation for irradiating said masks, each mask having a separate associated source of electromagnetic radiation; and cylindrical projection lens means for defining sharply boarded lines between bands in substantially only one direction and being located between said mask and said object surface for receiving energy rays from said masks as selected in sequence by operating the source associated with the mask selected and projecting the energy rays from the masks onto said object surface; coded patterns being selectively projected in sequence onto said object surface by operating selectively in sequence said sources of electromagnetic radiation.

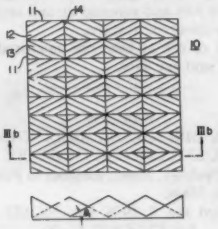
4,187,012

METHOD AND APPARATUS FOR EXPOSURE OF PHOSPHOR SCREEN

Takehiko Ueyama; Masahiro Nishizawa, both of Mobara; Elichi Yamazaki, Ichihara, and Iwao Ogura, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 16, 1978, Ser. No. 869,665
Claims priority, application Japan, Mar. 2, 1977, 52/21517
Int. Cl.[2] G03B *41/00*
U.S. Cl. 354—1 **14 Claims**

10. Exposure apparatus for forming a phosphor screen on the inner surface of a face plate of a color picture tube, comprising a single real linear light source disposed at a position spaced apart by a predetermined distance from the inner face of the face plate of the color picture tube while extending in parallel therewith, and a prism device disposed between said linear light source and the inner surface of said face plate, said prism device including a plurality of prisms closely arranged so as to constitute a means for causing said single linear real light



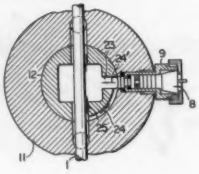
source to be observed as a plurality of virtual linear light sources from every point on said face plate, wherein said prisms are juxtaposed such that light-refracting surfaces of prisms, adjacent to each other in the direction of the length of said linear real light source, cross each other.

4,187,013

PHOSPHOR SCREEN EXPOSURE APPARATUS

Takasi Fujimura, and Syokichi Endo, both of Mobara, Japan, assignors to Hitachi, Ltd., Japan

Continuation of Ser. No. 710,306, Jul. 30, 1976, abandoned. This application Jan. 25, 1978, Ser. No. 872,038
Claims priority, application Japan, Oct. 6, 1975, 50-11973375
Int. Cl.[2] G03B *41/00*
U.S. Cl. 354—1 **5 Claims**



1. A phosphor screen exposure apparatus for color picture tubes containing a lamp housing, a light receiving system fitted in said lamp housing, an exposure object panel, a luminance correcting filter for correcting distribution of luminance on said panel, and a correction lens for aligning locus of a light emitted from said lamp housing with the actual path of an electron beam,

said lamp housing comprising:
a light source exposing a slurry coated on an inner surface of said exposure object panel through a shadow mask disposed near said inner surface of said panel;
a housing body portion holding said light source in place, said housing body portion including a space serving as a cooling water container, a first cooling water channel passing through said space and enclosing said light source therein for cooling said light source, a second cooling water channel connected between a portion of said first cooling water channel and said space, cooling water being adapted to flow in said first channel through said space and said second channel to cool said light source and said lamp housing;
a transparent upper plate transmitting light emanating from said light source toward said panel and making the cooling water container watertight; and
an opening provided to receive light emitted from said light

source, said light receiving system being fitted in said opening;

said light receiving system comprising:

a light receiver receiving the light emanating from said light source and generating, in response thereto, a control signal which controls the brightness of said light source;

a light receiver holder holding said light receiver in a predetermined position in said light receiving system, said light receiver holder being disposed in said opening of said lamp housing;

a transparent water sealing plate for sealing water and transmitting part of said light toward said light receiver;

a pinhole plate provided between said transparent water sealing plate and said light receiver for passing a part of the light entering said sealing plate; and

a spectral filter, disposed between said pinhole plate and said light receiver, for selecting and transmitting light having a predetermined wavelength range;

said light receiver being disposed in a recess in said light receiver holder,

said light receiving system being adapted to be cooled via heat transmission from said light receiving system to said lamp housing,

said second cooling water channel serving to prevent retention of bubbles in front of said transparent water sealing plate, and

said cooling water between said transparent water sealing plate and said light serving to absorb heat ray components in the light emitted from said light source and entering said sealing plate.

4,187,014

EYE FUNDUS CAMERA

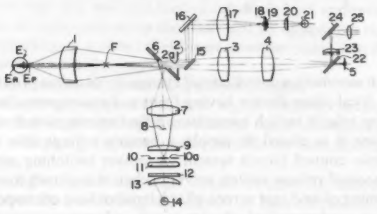
Yasuo Kato, and Kazuo Nunokawa, both of Tokyo, Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 30, 1978, Ser. No. 873,719

Claims priority, application Japan, Jan. 29, 1977, 52-8900; Jun. 28, 1977, 52-77040

Int. Cl.[2] A61B *3/14*; G03B *29/00*

U.S. Cl. 354—62 **9 Claims**



1. An eye fundus camera comprising a photographic optical system which includes at least an objective lens having an optical axis, an imaging lens and axially movable focusing means for adjusting the photographic optical system to obtain a desired focus condition; an eye fundus illuminating system including illuminating light source means directing light along an illuminating optical axis and an apertured reflecting means disposed in the optical axis of the objective lens in the photographic optical system for directing illuminating light from the illuminating optical axis to the objective lens so that the illuminating light is projected through the objective lens; and a focusing mark projecting system having an optical axis and which is separate from said illuminating optical axis including light splitting means provided behind the reflecting means adjacent to a position conjugate with an eye to be inspected with respect to the objective lens, mark projecting means for projecting a focusing mark along the optical axis of said mark projecting system through the light splitting means and the objective lens to the eye to be inspected, and means for interconnecting the mark projecting means with the focusing means so that focusing of the photographic optical system can be judged by the mark projected on the eye.

4,187,015

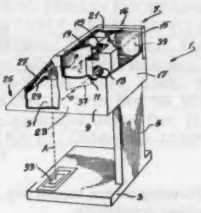
CAMERA SYSTEM

Barry Katsof, Montreal, and Joel Matlin, Dollard-des-Ormeaux, both of Canada, assignors to Camtron Electronics International Ltd., St. Laurent, Canada

Filed Nov. 18, 1977, Ser. No. 852,679

Int. Cl.[2] G03B *17/24*

U.S. Cl. 354—109 **24 Claims**



1. In a system for simultaneously photographically reproducing, on an instant film the images of two separate objects, a camera box comprising;

a first and second chamber disposed in side by side relationship within said camera box;

a first lens associated with said first chamber;

a second lens associated with said second chamber;

a first shutter associated with said first lens and having first adjustment means and first means operatively connected to said adjustment means of said first shutter;

a second shutter associated with said second lens and having second adjustment means and second means operatively connected to said adjustment means of said second shutter;

said first and second means being disposed to be readily accessible to an operator of said camera;

a first cable release mechanism associated with said first shutter, and a first cable operatively connected, at one end thereof, with said first release mechanism;

a second cable release mechanism associated with said second shutter, and a second cable operatively connected, at one end thereof, with said second release mechanism;

said first and second cables being connected, at the other ends thereof, to a single, common switch means;

whereby said first and second shutters can be opened and shut together and at the same time;

a front wall having an aperture therein in line with said first lens;

a back wall including means for mounting said instant film thereat;

a top wall and a bottom wall;

an extension housing extending outwardly from a side wall of said camera box and adjacent to an aperture therein;

said housing comprising;

a top wall extending at an angle to and downwardly with respect to the top wall of said camera box;

an aperture at the bottom surface of said housing;

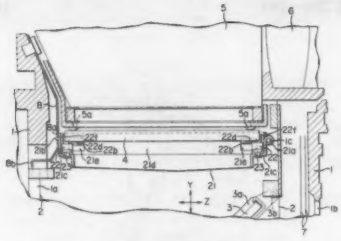
a mirror on the inner surface of said top wall of said housing; and

a second mirror disposed in said camera box adjacent said second chamber and positioned to receive reflections from said first mirror and to direct them to said second lens.

4,187,016
VIEWFINDER FOCUSING SCREEN SUPPORTING APPARATUS FOR SINGLE-LENS REFLEX CAMERA

Sunao Ishizaka, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Aug. 16, 1978, Ser. No. 934,211
Claims priority, application Japan, Aug. 17, 1977, 52/109154[U]
Int. Cl.[2] G03B *13/00, 19/12*
U.S. Cl. 354—152 2 Claims



1. A viewfinder focusing screen supporting apparatus for a single-lens reflex camera comprising:

(a) a focusing screen support frame provided with resilient support means for resiliently supporting a viewfinder focusing screen, said support frame being rotatable in the body of said camera so as to allow replacement of said focusing screen through the front opening of the camera body;

(b) positioning means provided under a pentaroof prism; and

(c) engaging means provided on said support frame and said camera body for mutual integral engagement of the two, said engaging means being adapted to press said focusing screen against said positioning means and fix said focusing screen in this position upon engagement of said support frame with said camera body by said engaging means, wherein said focusing screen support frame is composed of four side walls adapted to surround the periphery of said focusing screen, shoulder portions extending inwardly from said side walls, and an opening provided in the vicinity of each end of two mutually facing walls of said four side walls and above said shoulder portions; and said resilient means is composed of two arcuate spring members of a projected length somewhat larger than the length of said side walls not provided with said openings, said spring members being secured approximately at the center portions thereof to said shoulder portions of said side walls not provided with said openings, said spring members being adapted for insertion at the end portions thereof into said openings and maintained in pressure contact with the upper sides of said openings by the resilient force of said spring members when said focusing screen is positioned against said positioning means.

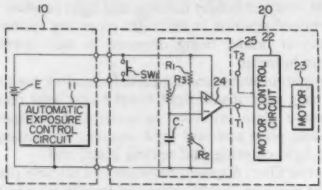
4,187,017
MOTOR DRIVE DEVICE IN A CAMERA

Sakuji Watanabe, Warabi, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Nov. 2, 1978, Ser. No. 956,901
Claims priority, application Japan, Nov. 11, 1977, 52/134703
Int. Cl.[2] G03B *1/00, 9/64*
U.S. Cl. 354—173 4 Claims

1. In a motor drive device capable of being coupled to a camera having an automatic exposure control circuit for determining the aperture value and/or the shutter speed during exposure in accordance with the brightness of an object to be photographed and wherein upon depression of a shutter release button provided on said device, a main switch for said automatic exposure control circuit and a second switch for supplying a photography signal to a control circuit for operating a motor for driving said camera are closed, the improvement comprising:

(a) delay circuit adapted to start operating upon closing of said main switch and generate a stability signal after the lapse of a predetermined time equal to the time equal to



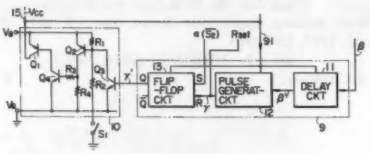
the time required for said automatic exposure control circuit to become stable in condition after being supplied with power; and

(b) means for operating said control circuit upon reception of both said stability signal and said photography signal.

4,187,018
AUTOMATIC CONTROL CIRCUIT SYSTEM FOR CAMERAS PROVIDED WITH A FOCAL-PLANE SHUTTER HAVING FRONT AND REAR SCREENS

Kenji Kanemaru, Chiryu, and Takashiroh Iwasaki, Tokyo, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 10, 1978, Ser. No. 923,197
Claims priority, application Japan, Jul. 18, 1977, 52-85061
Int. Cl.[2] G03B *7/08, 17/38*
U.S. Cl. 354—266 5 Claims



1. An automatic control circuit system for cameras provided with a focal-plane shutter having front and rear screens, and a two-step release switch comprising a first release switch serving when it is closed to supply a battery voltage into said automatic control circuit system via power switching means and a second release switch serving when it is closed to start the running of said rear screen after a lapse of time corresponding to a predetermined shutter speed, wherein said power switching means includes at least a semiconductor switching element having first and second electrodes and a control electrode, the electrical conduction and non-conduction between said first and second electrodes are controlled by electric signals applied to said control electrode, and said first and second electrodes are connected to a battery and a power supplying line in said automatic control circuit system, respectively, wherein said automatic control circuit system is provided with an electric signal holding circuit which is triggered with an electric signal generated by the closing action of said second release switch to hold an output terminal by an output signal which holds at said control electrode an electric signal which conducts electrically between said first and second electrode of said semiconductor switching element, and wherein said electric signal holding circuit is reversely triggered with an electric signal which is generated based on the closing of said second release switch when an instruction to start the running of said rear screen of said focal-plane shutter is given or after a predetermined period of time has elapsed

after said instruction was given, to end the hold at said output terminal of said output signal,

characterized in that said control electrode of said semiconductor switching element is actuated by a closing action of said first release switch to conduct electrically between said first and second electrodes without any mechanical or electrical holding operations, so that said semiconductor switching element can end the supply of the supply voltage from said battery to said power supplying line according to the opening action of said first release switch before a closing action of said second release switch.

4,187,019

FLASH LIGHT PHOTOGRAPHIC SYSTEMS

Takashi Uchiyama, Yokohama; Zenzo Nakamura, Urawa; Tokuichi Tsunekawa, Yokohama; Masanori Uchidoi, Yokohama; Yukio Mashimo, Tokyo, and Shyohei Ohtaki, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

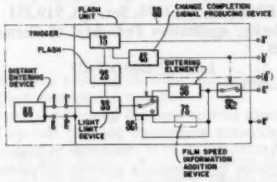
Continuation of Ser. No. 625,711, Oct. 24, 1975, Pat. No. 4,078,242. This application Aug. 12, 1977, Ser. No. 824,102

Claims priority, application Japan, Oct. 29, 1974, 49-124612; Oct. 30, 1974, 49-125110

The portion of the term of this patent subsequent to Mar. 7, 1995, has been disclaimed.

Int. Cl.[2] G03B *7/16*

U.S. Cl. 354—33 **22 Claims**



1. A flash unit usable with either a first camera having a terminal for receiving a diaphragm aperture control signal from the flash unit and/or a second camera, which controls the amount of light emitted by the flash unit by applying a signal corresponding to a preset diaphragm aperture value into flash unit, said unit comprising:

(a) flash means for generating a flash of light,

(b) diaphragm aperture control signal forming circuit to form a diaphragm aperture control signal corresponding to a diaphragm aperture value suitable for flash photography,

(c) a light emission control circuit coupled to said flash means for controlling the amount of light emitted by said flash means,

(d) a diaphragm aperture information input means coupled to said light emission control circuit for inputting a signal corresponding to the diaphragm aperture value preset into the second camera to set a diaphragm aperture value information into said light emission control circuit,

(e) a signal transmission circuit for outputting the diaphragm aperture control signal from the flash unit and for inputting said signal corresponding to a preset diaphragm aperture value selectively, said signal transmission circuit including switching means for alternately selecting said diaphragm aperture control signal forming circuit or said diaphragm aperture information input means so that when diaphragm aperture control signal forming circuit is selected by the switching means, a signal corresponding to a diaphragm aperture value is outputted from the signal transmission circuit to the first camera so as to allow a flash photography with the first camera and when the diaphragm aperture information input means is selected by switching means, a preset diaphragm aperture value information is set to the light emission control circuit so as to allow a flash photography with the second camera.

7. A flash unit according to claim 1, in which said second camera includes a light measuring circuit for producing an output corresponding to the intensity of light to be photographed and shutter time control circuit for controlling the shutter time based on the output of said light measuring circuit, said shutter time control circuit including shutter time regulating circuit for regulating the shutter time suitable for flash photography when the shutter time corresponding to the output of said light measuring circuit is not suitable for flash light photography.

4,187,020

TRIPOD RACK AND PINION FOCUSSING MECHANISM ROTATABLE RELATIVE TO LENS

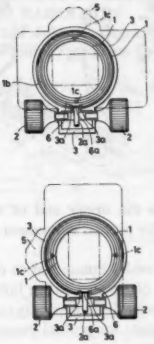
Tadayoshi Ishii, Hannou; Zenichi Okura, Omiya, and Takeshi Machida, Tokyo, all of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 13, 1978, Ser. No. 951,206

Claims priority, application Japan, Oct. 15, 1977, 52/123927

Int. Cl.[2] G03B *3/00, 17/00*

U.S. Cl. 354—195 **4 Claims**



1. In a rack and pinion type focussing mechanism for a camera, a lens having a tripod mounting seat, the improvement comprising; focussing operational means disposed on said tripod mounting seat rotatable with respect to the lens around the optical axis of the lens.

4,187,021

ADJUSTABLE FLASH BRACKET

John L. Balser, 413 New York Ave., McComb City, Pike County, Miss. 39648

Filed Jun. 28, 1978, Ser. No. 919,817

Int. Cl.[2] G03B *17/00*

U.S. Cl. 354—293 **19 Claims**

1. A flash bracket for a camera comprising:

an elongated base frame having a longitudinal axis;

first and second elongated handle members mounted on opposite ends of said elongated base frame and having parallel axes in a common plane with and oriented perpendicular to the longitudinal axis of said base frame;

a camera connection and support means on said elongated base frame intermediate said first and second elongated handle members for supporting a camera attached thereto;

a flash support head for releasably supporting a flash unit; and

selectively positionable support means for said flash support head including:

swing linkage means extending between said first elongated handle means and said flash support head for permitting selective positioning of said flash support

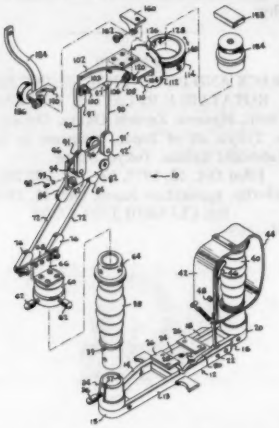
head in a swing plane parallel to the plane in which the axes of said first and second elongated handle means are located;

head tilt pivot means for permitting said flash support head to be selectively rotated about a tilt axis in a plane parallel to said swing plane to a desired tilt position;

releasable means for maintaining said flash support head in said desired tilt position; and

wherein said swing linkage means includes:

an inner pair of parallel swing links pivotally connected



on one end to the upper end of said first elongated handle means for pivotal movement about spaced parallel pivot axes;

a swing plate pivotally connected to the opposite ends of said inner pair of parallel swing links;

an outer pair of swing links pivotally connected at one end to said swing plate for pivotal movement about spaced parallel pivot axes; and

a carrier bracket pivotally connected to the opposite end of said outer pair of parallel swing links, said head tilt pivot means being mounted on said carrier bracket.

4,187,022

APPARATUS FOR TRANSPORTING WEBS OF PHOTOSENSITIVE MATERIAL

Karl Walter, Penzberg, Fed. Rep. of Germany, assignor to Labortechnik M. R. Walter, Penzberg, Fed. Rep. of Germany

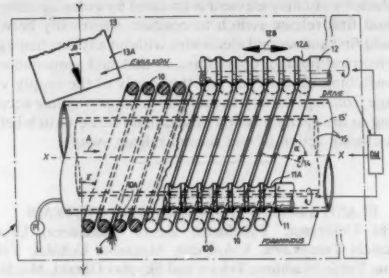
Filed Feb. 5, 1979, Ser. No. 9,513

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1978, 2804724

Int. Cl.[2] G03D *5/06*

U.S. Cl. 354—318 **13 Claims**

1. Apparatus for transporting webs of photosensitive material along a helical path, comprising a plurality of parallel ring-shaped advancing elements disposed in planes making acute angles with the axis of said path and having inner surfaces adjacent to said path; and means for rotating said elements about their respective axes in a predetermined direction



so that a web whose leader is introduced into said path is engaged and entrained by said inner surfaces.

4,187,023

APPARATUS FOR WET TREATMENT OF RUNNING WEBS OF PHOTOGRAPHIC MATERIAL

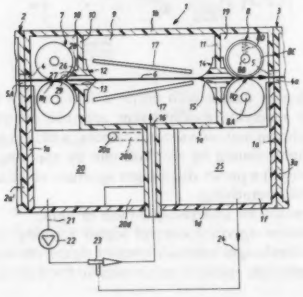
Helmut Schausberger, Unterhaching, and Rudolf Brunner, Munich, both of Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

Filed Jun. 26, 1978, Ser. No. 919,271

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1977, 2731045

Int. Cl.[2] G03D *3/02*

U.S. Cl. 354—321 **28 Claims**



1. Apparatus for wet treatment of webs of photographic material, comprising a housing having an inlet and an outlet, said housing including spaced-apart first and second internal partitions which divide the interior of said housing into a processing chamber between said partitions, a first compartment between said inlet and said first partition, and a second compartment between said second partition and said outlet; a source of processing liquid; means for supplying liquid from said source to said chamber and for maintaining a body of the liquid in said chamber at a predetermined level; means for passing webs of photographic material between said compartments and said chamber through said first and second partitions, including first and second flow restrictors respectively having aligned substantially horizontal first and second slots communicatively connecting said chamber with the corresponding compartments below said predetermined level and having such dimensions as to permit the webs to pass therethrough without hindrance and to restrict the outflow of the liquid therethrough from said chamber into said compartments to a minimum; and means for transporting webs of photographic material from said inlet to said outlet via said first and

second slots and through said body of liquid below said predetermined level, including a first pair of horizontal advancing rolls installed in said first compartment and having a nip adjacent to said first slot and a second pair of advancing rolls installed in said second compartment and having a nip adjacent to said second slot.

4,187,024

ELECTROSTATIC COPYING MACHINE

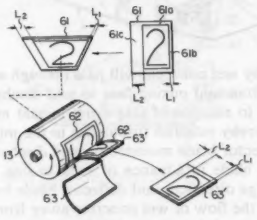
Toyokazu Satomi; Yutaka Koizumi; Isao Nakamura; Yasuhiro Tabata, and Tamaki Kaneko, all of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 7, 1978, Ser. No. 884,137

Claims priority, application Japan, Mar. 9, 1977, 52-25769; Apr. 6, 1977, 52-39190

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—14 R **12 Claims**



1. An electrostatic copying machine comprising:

a moving photoconductive member;

imaging means for forming first and second toner images of first and second original documents respectively on the photoconductive member;

transfer means for moving a copy sheet into engagement with the photoconductive member to transfer the first and second toner images onto first and second sides of the copy sheet respectively; and

control means for controlling the imaging means and transfer means so that the first and second toner images are superposed on the copy sheet in such a manner that the centers of the toner images on the opposite sides of the copy sheet are coincident with each other, the first and second toner images being offset from a center of the copy sheet.

4,187,025

DEVICE FOR PRODUCING A LIGHT SIGNAL CORRESPONDING TO THE REFRACTIVE INDEX OF A FLUID

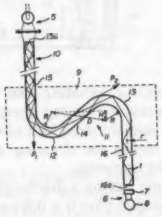
Alan L. Harmer, Geneva, Switzerland, assignor to Battelle Memorial Institute, Geneva, Switzerland

Filed Jun. 28, 1978, Ser. No. 919,981

Claims priority, application Switzerland, Jul. 1, 1977, 8105/77

Int. Cl.[2] G01N *21/46*

U.S. Cl. 356—133 **11 Claims**



1. A device for producing a light signal corresponding to the refractive index of a fluid, comprising an elongated light-conducting body consisting of an input section and an output section connected to each other by an intermediate curved section adapted for immersion in said fluid, so that when light is injected into the free end of said input section, the passage of light by refraction into said fluid is a function of the refractive index of said fluid and the light emerging at the free end of said output section provides a light signal corresponding to the refractive index of said fluid, said device being characterized in that said intermediate curved section has a profile comprising a plurality of curvatures arranged successively so as to be alternately bent in opposite directions to one another, whereby said curvatures together provide passage by refraction into said fluid of an amount of light which varies as a function of the refractive index of said fluid, this variation being notably higher than can be obtained with a curved section bent in a single direction, to thereby provide said light signal with a high sensitivity.

4,187,026

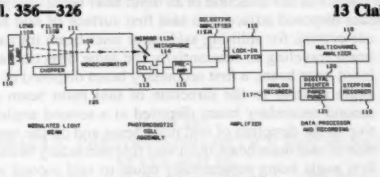
PHOTOACOUSTIC METHOD AND APPARATUS FOR MEASURING INTENSITY OF ELECTROMAGNETIC RADIATION

Arnold M. Schaffer, and John A. Favre, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 29, 1977, Ser. No. 838,030

Int. Cl.[2] G01J *3/28*

U.S. Cl. 356—326 **13 Claims**



1. A method of measuring the intensity of a beam of electromagnetic radiation, said method comprising:

(a) passing said beam of electromagnetic radiation into a monochromator and into a chopper in either possible order, thereby producing a periodically pulsed monochromatic beam of electromagnetic radiation having a chopping frequency f;

(b) passing said periodically pulsed monochromatic beam of electromagnetic radiation into a cell which contains carbon black and a gas, at least one wall of said cell being made of a material which transmits electromagnetic radiation substantially independently of wavelength of incident electromagnetic radiation, and said pulsed monochromatic beam of electromagnetic radiation being directed so that it impinges upon said carbon black, thereby producing changes in pressure of said gas located within said cell;

(c) detecting said changes in pressure of said gas located within said cell with a microphone which operates in cooperation with said cell and which has a diaphragm that forms a flexible wall of said cell, said microphone producing electrical signals which are representative of said changes in pressure of said gas located within said cell, each of said electrical signals having a component which is out of phase with said pulsed monochromatic beam of electromagnetic radiation and having a component which is in phase with said pulsed monochromatic beam of electromagnetic radiation;

(d) amplifying said component which is in phase with said pulsed monochromatic beam of electromagnetic radiation with use of a lock-in amplifier which is locked in to the chopping frequency f, thereby producing an amplified signal; and

(e) recording said amplified signal,

said carbon black being such that it has a specific surface

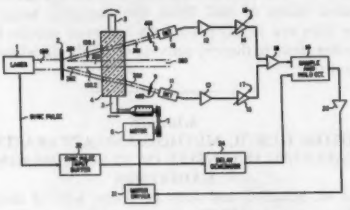
area (SSA, which is measured in M^2/g per CTAB absorption test) within the range from about 20 to about 700 m^2/g.

4,187,027

SERVO-CONTROL ALIGNMENT OF NONLINEAR CRYSTALS

Gary C. Bjorklund, West Windsor, and Ralph H. Storz, Freehold, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 20, 1978, Ser. No. 898,371
Int. Cl.[2] G01B *11/26*
U.S. Cl. 356—400 **5 Claims**



1. Apparatus for servo-locking the angular orientation of a nonlinear crystal having a front surface and a back surface with respect to the direction of an input laser beam comprising:

means disposed adjacent to said first surface of said nonlinear crystal, for splitting said input laser beam into a main beam traveling in substantially the same direction as said input laser beam, a first secondary beam disposed at a first angle relative to the direction of said main beam and a second secondary beam disposed at a second angle relative to the direction of said main beam and on the opposite side of said main beam from said first secondary beam, said first angle being substantially equal to said second angle;

means for supporting said nonlinear crystal in a rotatable mounting in such a manner that said first secondary beam, said second secondary beam, and said main beam all pass through said nonlinear crystal to form a first secondary output beam from said first secondary beam, a second secondary output beam from said second secondary beam and a main output beam from said main beam so that said first secondary output beam, said second secondary output beam, and said main output beam all contain a further frequency component produced by the nonlinear optical mixing process in said nonlinear crystal;

a first radiation detector means for generating a first electric signal in response to the intensity of said further frequency component of said first secondary output beam;

a second radiation detector means for generating a second electric signal in response to the intensity of said further frequency component of said second secondary output beam;

means for producing a discrimination signal in response to the difference between said first electric signal and said second electric signal; and

means for rotating said rotatable mounting in response to said discrimination signal.

4,187,028

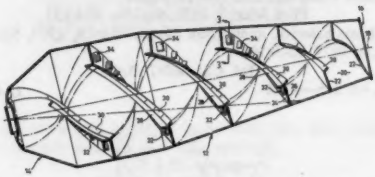
MIXING BLADE FOR CONCRETE MIXER

Jess W. Pawley, London, Canada, assignor to London Concrete Machinery Co., London, Canada

Filed Nov. 6, 1978, Ser. No. 957,936
Int. Cl.[2] B28C *5/18, 7/16*
U.S. Cl. 366—44 **5 Claims**

1. In a rotary concrete mixing drum mounted for rotation about a rotary axis, said mixing drum having a mixing chamber formed therein, said mixing chamber having a head end and a discharge end arranged opposite one another, a mixing blade disposed within said mixing chamber, said mixing blade having a mixing face directed toward said head end to establish a fluid flow in a direction toward said head end of said chamber in response to rotation of said blades in a mixing direction about said rotary axis and a discharge face directed toward the discharge end of said mixing drum to establish a fluid flow in a direction toward said discharge end of said chamber in response to rotation in said discharge direction, the improvement of;

(a) a plurality of mixing passages opening through said mixing blade between said mixing face and said discharge face



whereby wet concrete will pass through said mixing passages from said mixing face to said discharge face in response to rotation of said drum in said mixing direction and thereby establish turbulence in the mixing chamber,

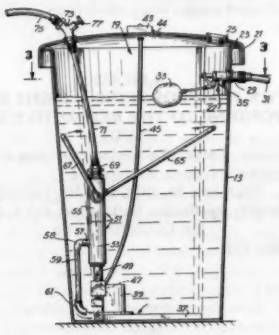
(b) a deflector blade mounted on said discharge face of said mixing blade in advance of each mixing passage in the discharge direction, said deflector blade being adapted to deflect the flow of wet concrete away from its associated mixing passage to permit discharge of wet concrete from said discharge end in response to rotation in said discharge direction.

4,187,029

APPARATUS AND METHOD FOR PREPARING LITHOGRAPHIC FOUNTAIN SOLUTION

Ralph D. Canale, 11-09 43rd Rd., Long Island City, N.Y. 11101, and Albert S. Canale, 226-27 B Kingsbury Ave., Bayside, N.Y. 11364

Filed Aug. 8, 1978, Ser. No. 931,988
Int. Cl.[2] B01F *3/12, 13/00, 15/02*
U.S. Cl. 366—153 **14 Claims**



1. An apparatus for agitating and circulating a fountain solution for lithographic printing operations comprising:

a container for said solution, said container having a depth,

suction pump means for drawing said solution from the bottom of said container,

said suction pump having a discharge outlet through which solution is pumped after it is drawn into said pump means;

manifold means, operatively connected with the discharge outlet of said pump means, for receiving solution from said pump means,

said manifold means provided with a plurality of outlet means for discharging solution drawn by said suction pump means, out of said manifold means;

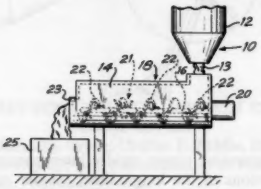
arm means operatively associated with said outlet means for directing solution discharged through said manifold outlet means into said container at at least two different depths within said container, and oriented to form a circulating pattern for said solution in said container thereby to mix and agitate said solution in said container.

4,187,030

MIXER-AUGER MECHANISM FOR XEROGRAPHIC DEVELOPER COMPOSITIONS

William P. Godley, Sandy Hook, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Dec. 20, 1978, Ser. No. 971,203
Int. Cl.[2] B01F *7/08*
U.S. Cl. 366—319 **7 Claims**



1. In a xerographic copying machine in which a toner developer composition is to be mixed and conveyed to a central point, the improvement in the means for mixing and conveying said toner, comprising:

a shaft;

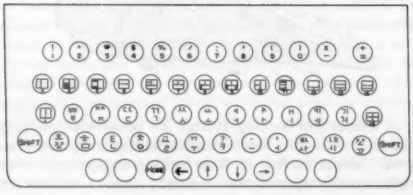
a plurality of fin sections defining a helical conveyer structure, each fin section including a hub member having key means whereby said plurality of fin sections can be linked longitudinally with respect to said shaft, said fin sections having spaced bypass openings therein, and at least one of said sections having paddles or fins extending angularly from one side of said openings so as to produce thorough mixing of said toner and another of said fin sections including primary fins which are wound in a first helical direction and secondary fins which extend in a reverse helical direction through said bypass openings.

4,187,031

KOREAN (HANGUL) ELECTRONIC TYPEWRITER AND COMMUNICATION EQUIPMENT SYSTEM

Chan H. Yeh, 532 Mercury Dr., Sunnyvale, Calif. 94086

Filed Mar. 13, 1978, Ser. No. 885,571
Int. Cl.[2] B41J *3/10, 3/46, 5/10*
U.S. Cl. 400—83 **4 Claims**



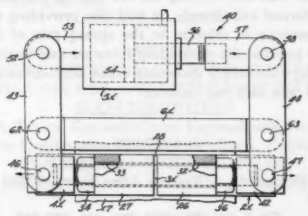
1. A Korean language typewriter system for reproducing Korean words, comprising a keyboard means having keys corresponding to each of the arrangements in which Korean alphabet elements are arranged into words and means connected to the respective keys for generating a binary number signal corresponding to a respective one of said arrangements when the corresponding key is actuated, further keys for each of the plurality of alphabet elements of the Korean alphabet and means connected to the respective further keys for generating a binary number signal corresponding to a respective one of said alphabet elements when the corresponding further key is actuated; storage means for storing sets of hexadecimal numbers each representing an elementary alphabet element on a matrix of a predetermined size; computer means connected between said signal generating means and said storage means and having a display means for displaying a word arrangement pattern of spaces corresponding to one of the arrangements of Korean alphabet elements into words in response to a binary number signal for such a word arrangement from said keyboard means and for retrieving stored sets of hexademical numbers respresenating alphabet elements in response to binary number signals for such elements to fill the spaces in said word arrangement pattern from said keyboard means, changing the size of the matrix pattern of the retrieved sets of hexadecimal numbers for causing the matrix patterns to fit in the corresponding spaces in the word arrangement pattern and then displaying the matrix patterns in the spaces in the sequence in which the binary number signals for the alphabet elements are received from said keyboard means; and matrix printer means connected to said computer means for printing out only the said matrix patterns for the alphabet elements arranged in the word arrangement pattern of spaces for representing a Korean word.

4,187,032

HYDRAULIC PRESTRESSING DEVICE FOR SHEAR LEVER BOLTS

Thomas R. Schucker, York, Pa., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Oct. 20, 1978, Ser. No. 952,997
Int. Cl.[2] F16D *1/00;* **F16L** *17/00, 29/00*
U.S. Cl. 403—15 **2 Claims**



1. A prestressing device for a threaded clamping bolt utilized to frictionally clamp a first operating member to a second operating member;

a clamp bolt extending through the first operating member;

lever means pivotally connected to the extending ends of said clamp bolt;

a fulcrum bar interconnected between said lever means;

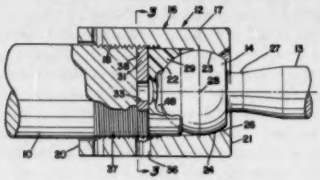
a pressure fluid operator means interconnected between said lever means and operable when energized to move said lever means on said fulcrum bar to effect prestressing of said clamp bolt; and,

means on said clamp bolt engageable with the first operating means to effectively clamp said first operating member to the second operating means after said pressure fluid operator is deenergized.

4,187,033
VARIABLY PRELOADED BALL JOINT ASSEMBLY

Leonard J. Zukowski, Sterling Heights, Mich., assignor to TRW Inc., Cleveland, Ohio

Filed Sep. 16, 1977, Ser. No. 833,739
Int. Cl.[2] F16D 1/12; F16C 11/06
U.S. Cl. 403—137 23 Claims



1. An apparatus for connecting a drive member and a tie rod member in a dirigible wheel steering system comprising a ball stud formed with a ball end, a socket assembly including a tubular housing having an internal thread extending inwardly from one end and adapted to have one of said members threaded therein, said tubular housing enclosing said ball end at its other end, said socket assembly providing a pair of opposed bearing surfaces engaging opposite hemispheres of said ball end and journaling said ball stud for tilting and rotational movement with respect to said socket assembly, a disc forming part of said socket assembly threaded into said internal thread, high rate spring means operable between said disc and at least one of said bearing surfaces, said disc being threaded to a preload position in which it preloads said spring means and is locked in said position, said spring means causing said bearing surfaces to be resiliently biased against said ball end with a predetermined preload force due to preloading by said disc, the threaded connection between said disc and said internal thread being sufficiently strong to maintain said preload but insufficiently strong to safely support loads applied to said one bearing surface, said ball and socket assembly being installed in the steering system by threading said internal thread over the threaded end on one of said members until said threaded end engages said disc, said threaded end providing sufficient support for said disc when installed to safely support the loads applied to said one bearing surface during the use, and said internal thread and threads on said disc providing sufficiently small clearance in relation to the spring rate of said spring means to prevent the preloading force on said bearing surface from being excessively increased when said socket assembly is threaded onto said one member.

4,187,034
RIGID JOINT ASSEMBLY

Richard Dzlewolski, 8 Bis rue Jules Ferry, 92100 Boulogne, France

Filed Apr. 29, 1977, Ser. No. 792,127
Claims priority, application France, May 5, 1976, 76 13324; May 20, 1976, 76 15290; Jul. 28, 1976, 76 22925
Int. Cl.[2] F16D 1/00, 3/00; F16G 11/00
U.S. Cl. 403—217 4 Claims

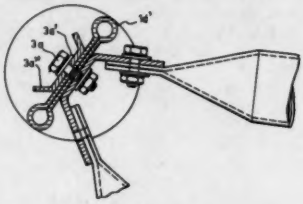
1. A structural joint comprising, in combination:

(a) first and second longitudinal metallic tubular members of generally circular cross section, arranged in coaxial, longitudinally abutting relationship, adjacent end portions of said longitudinal tubular members being flattened over a predetermined length into a configuration in which they jointly define two flat, mutually spaced, external longitudinal wall portions which are parallel to each other and are parallel and symmetrical with respect to the common geometrical axis of said longitudinal tubular members;

(b) an external butt-strap member having a flat wall portion placed in engagement with one of said flat wall portions of the longitudinal members over at least a major portion of said predetermined length thereof;

(c) a connecting member having a central flat wall portion engaging the other of said flat wall portions of the longitudinal members over a major portion of the length thereof, and having two lateral flat wall portions each forming a predetermined dihedral angle with said central wall portion;

(d) an internal butt-strap member, at least a major portion of which is received in the space between said flat wall portions of the longitudinal members, and which extends over at least a major portion of said predetermined length thereof;



(e) first connecting means rigidly interconnecting said flat wall portions of the longitudinal tubular members, said external butt-strap member, said internal butt-strap member, and said connecting member along said predetermined length;

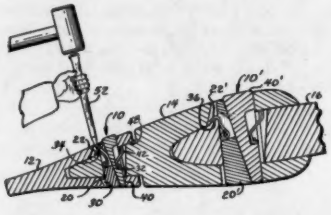
(f) at least two further tubular members of generally circular cross section having each a flattened end portion containing the geometrical axis of the related one of said further members and symmetrical to said axis of the related further member; and

(g) second connecting means rigidly securing the flattened end portions of said further members to at least one of said lateral flat wall portions of said connecting member.

4,187,035
KEEPER PIN SYSTEM FOR SHOVEL TEETH

Edward N. Colburn, 5312 Vincent Ave. South, Minneapolis, Minn. 55410

Filed Feb. 14, 1979, Ser. No. 12,011
Int. Cl.[2] B25G 3/00; F16B 3/00
U.S. Cl. 403—318 9 Claims



1. A keeper pin locking system for positively retaining a replaceable excavator tooth member having a tapered female internal contact surface in firm locking engagement with a complementary tapered male external contact surface on a tooth supporting base member comprising a pair of first and second wedge members which are adapted, respectively, to engage each other and portions of one of the opposite sides of vertically aligned transverse apertures formed through said tooth member and base member in the region of said complementary tapered internal and external contact surfaces; retain-

ing means on each of said pair of wedge members which extend beyond the wedge surfaces in the longitudinal direction of the tooth member; said retaining means being adapted to engage retaining portions on said tooth or on said tooth supporting base member; said retaining means being engageable with said retaining portions when said wedge members are in contacting overlying relationship with each other to prevent the removal of said wedge members from said transverse apertures.

4,187,036

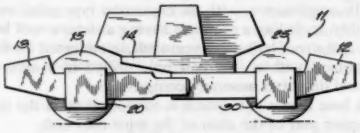
VIBRATION CONTROL FOR ASPHALT ROADWAY COMPACTOR

Edwin J. Haker, Elm Grove; Charles F. Riddle, Brookfield, and Ralph F. Bielinski, South Milwaukee, all of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Filed Sep. 7, 1978, Ser. No. 940,416

Int. Cl.[2] E01C *19/38*

U.S. Cl. 404—117 **5 Claims**



5. A self-propelled dual vibratory roll roadway compactor having a single lever control which initiates travel in a forward or reverse direction and thereupon through an electrical system initiates the desired vibration of the two rolls, each roll having a drive motor and a motor which effects such vibration, said control being connected to said motors to control their operation as aforesaid; said electrical system including (1) a speed control for each motor which determines the frequency level of roll vibration in response to a control voltage, sources of control voltages including at least one adjustable control voltage and a voltage providing a zero frequency level, that is no vibration, (2) first and second sets of switches operated by said lever, the first set being closed by lever control movement which initiates forward travel of the machine and the second set being closed by movement of the lever control which initiates reverse travel of the machine, and (3) a mode control switch having means selectively connecting selected voltage sources with said speed controls through said first set of switches whereby the forward and rear rolls are vibrated respectively at selected levels when the machine travels forwardly, said mode control switch also having means connecting selected voltage sources with said speed controls through said second set of switches whereby the rear and forward rolls are vibrated respectively at selected levels when the machine travels rearwardly, said means including a reversing switch connected to said other switches to reverse said connections whereby the rear and forward rolls are vibrated respectively at said first mentioned selected levels when the machine travels rearwardly and the forward and rear rolls are vibrated respectively at the second mentioned selected levels when the machine travels forwardly.

4,187,037

WALL SUPPORTING ARRANGEMENT, ESPECIALLY FOR SUPPORTING MINE GALLERY WALLS

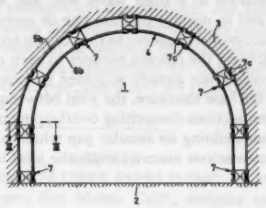
Rudolf Seiz, H. Rainer Str. 10, 8036 Herrsching (Ammersee), Fed. Rep. of Germany, and Lothar Sebastian, Essen, Fed. Rep. of Germany, assignors to Rudolf Seiz, Herrschin, Fed. Rep. of Germany

Filed Mar. 2, 1978, Ser. No. 882,568

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1977, 2709242; Sep. 10, 1977, 2740908

Int. Cl.[2] E21D *11/00*

U.S. Cl. 405—150 **27 Claims**



1. A wall supporting arrangement, especially for supporting mine gallery walls, comprising

a supporting frame for a wall and including at least two frame elements spaced from one another in a direction transverse to the direction of elongation of the wall; and

connecting means including a plurality of shape-retaining shell-shaped connecting elements distributed along said frame elments, each of said connecting elements including at least two shape-retaining shell portions each having two side edges facing away from the side edges of the other shell portion and connected with at least one of the frame elements, and a bottom wall facing toward and connected with the bottom wall of the other shell portion in the region which is located substantially centrally between said frame elements so that the latter are connected with one another in spatially fixed relationship and rigidly, both in the direction of elongation of the wall and in the transverse direction.

4,187,038

EQUIPMENT FOR EXTRACTING OIL OR GAS FROM UNDER THE SEA BED AND METHOD OF INSTALLING SUCH EQUIPMENT

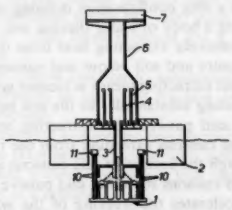
Reginald S. Taylor, Gerrards Cross, England, assignor to Taylor Woodrow Construction Limited, Middlesex, England

Filed Aug. 29, 1977, Ser. No. 828,864

Claims priority, application United Kingdom, Aug. 27, 1976, 35844/76

Int. Cl.[2] E02D *25/00*

U.S. Cl. 405—204 **15 Claims**



1. A method of providing an installation for extracting oil or gas from under the sea bed at a deep water site, which installa-

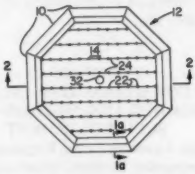
tion comprises a base structure anchored to the sea bed so as to be below the surface and a column which extends from the base structure to above the surface, the column being in the form of a hollow pre-stressed concrete tube for accommodating conductors for oil or gas extending from the sea bed, through the base structure and the column to above the surface, the method comprising constructing at a dry or relatively shallow water site the base structure and at least two elongate hollow pre-stressed concrete column sections arranged telescopically one within the other and providing the base structure and the column sections with sufficient buoyancy for them to float; floating and transporting the base structure and the column sections to a deep water site; and sinking the base structure and in upright position one or more of the column sections successively relative to the column section that is next above it; joining the column sections to each other and to the base structure if not already so joined to form a column connected to the base structure, the joint between each two adjacent column sections comprising overlapping portions of these two sections defining an annular gap which is filled with fast setting cementacious material while the joint is still above the water level.

4,187,039

METHOD AND APPARATUS FOR CONSTRUCTING AND MAINTAINING AN OFFSHORE ICE ISLAND

Hans O. Jahns, and Newton K. Maer, Jr., both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Sep. 5, 1978, Ser. No. 939,538
Int. Cl.[2] E02B *17/00*; E02D *23/16*
U.S. Cl. 405—217 **22 Claims**



1. An apparatus for constructing an offshore ice island in an Arctic environment comprising:

a plurality of caissons, having a top and bottom, adapted to be submerged to the bottom of a body of water and arranged in a ring configuration defining an enclosure for maintaining a body of water therein, and

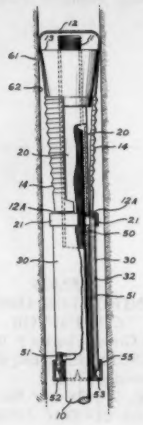
means for passively extracting heat from the water within said enclosure and soil below said caissons wherein said passive heat extracting means is located within said enclosure extending substantially to the soil below said enclosure and said passive heat extracting means is located within said caissons extending from the top of said caissons through the bottom of said caissons and into the soil below said caissons such that said passive heat extracting means accelerates the freezing of the water within the enclosure and the soil below said caissons in a unitary manner forming a mass of frozen material having a frozen soil ring below said island which improves the lateral stability of said island.

4,187,040

MINE ROOF BOLT SPIKE CHEMICAL DISPENSER ASSEMBLY

David C. Donan, Jr., Hopkins County, Ky., assignor to Waiamea Company, Inc., Manitou, Ky.

Filed May 31, 1978, Ser. No. 911,225
Int. Cl.[2] E21D *21/00*
U.S. Cl. 405—259 **9 Claims**



1. In combination with an expansion type mine roof bolt assembly, including a roof bolt having a stem, a roof bolt base plate, and a roof bolt expansion shell unit adapted for selective engagement with a roof bolt hole drilled in a mine roof, a chemical dispenser assembly comprising:

a. a base flange unit which is supported from the threaded upper part of the stem of the mine roof bolt;

b. a chemical container inserted down over the stem of the roof bolt and placed in position on top of the base flange unit, the container having a cavity for storage of chemicals,

c. a pressure sleeve unit which is slipped over the upper threaded portion of the roof bolt stem so that it may slide freely along the roof bolt stem, and being in a selective relationship between the roof bolt expansion shell assembly and the top of the chemical container, whereby upon tightening the roof bolt the pressure sleeve transmits a rupture force to the chemical container to cause the contents of the container to be expelled into the roof bolt hole.

4,187,041

METHOD FOR CONSOLIDATING A BODY OF EARTH

Per Boman, Täby, and Bengt Broms, Vällingby, both of Sweden, assignors to Linden-Alimak A.B., Skellefteå, Sweden

Continuation of Ser. No. 637,169, Dec. 3, 1975, abandoned. This application Jan. 18, 1979, Ser. No. 4,344
Int. Cl.[2] E02D *3/14*
U.S. Cl. 405—263 **3 Claims**

1. A method for consolidating a body of earth including substantially horizontal layers of varved clay by vertical draining and loading, comprising

drilling a plurality of holes down into said body of earth substantially transverse to said layers of varved clay and injecting lime into the earth through said holes under pressure without substantial disturbance of said layers during the drilling and injecting steps, to chemically react with at least one of the natural constituents of the earth to thereby increase the permeability in spaced regions extending in the vicinity of each of said holes and having essentially direct contact with said layers, and

loading said body of earth by a static pressure means so as to

cause water outflow from the earth through said increased permeability regions from the natural draining layers of the earth along the layers of varved clay.

4,187,042

ADVANCE MECHANISM FOR A MINE ROOF SUPPORT UNIT

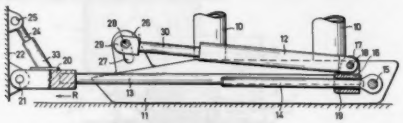
Lubomir Plevak, Lunen, and Jürgen Dodt, Menden, both of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lunen, Fed. Rep. of Germany

Filed Sep. 25, 1978, Ser. No. 945,380

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1977, 2744992

Int. Cl.² E21D *15/44*

U.S. Cl. 405—291 **13 Claims**



1. In a roof support unit for use in a longwall face of a mineral mining working, the roof support unit having a floor sill, a roof shield supported on the floor sill by hydraulic prop means, and an advance mechanism comprising a hydraulic advance ram and guide means, the improvements comprising constituting the guide means by guide rod means and a guide rail, one end of the guide rod means being attached to a conveyor extending along the longwall face, the other end of the guide rod means being attached to a guide element, the guide rail extending slidably through a guide aperture in the guide element and being pivotally attachable to the roof support unit for pivotal movement in a vertical plane perpendicular to the longwall face, the hydraulic advance ram being attached to the guide element and acting on a member fixed to the support unit.

4,187,043

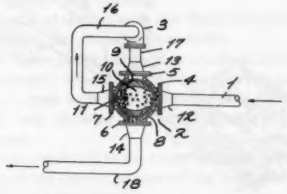
METHOD AND APPARATUS FOR BOOSTING PRESSURE IN A COAL PIPELINE

Peter G. Kindersley, Glens Falls, N.Y., assignor to Kamyr, Inc., Glens Falls, N.Y.

Filed Jul. 23, 1974, Ser. No. 491,132

Int. Cl.² B65G *53/30, 53/58*

U.S. Cl. 406—105 **20 Claims**



11. Apparatus for boosting the fluid pressure of a liquid transporting particulate solids in a pipeline from a first point of low fluid pressure in the pipeline to a higher fluid pressure at a second point, closely adjacent said first point, in said pipeline downstream of said first point without directly acting on the particles being transported by the liquid, said apparatus comprising

(a) means for confining an established confined continuous flow of liquid and solid particles from said first point along a continuous flow path to said second point,

(b) means for substantially continuously removing from communication with said flow path at a transfer point successive volumes of solid particles larger than a predetermined size entrained in liquid from said liquid while permitting liquid with solid particles smaller than said predetermined size to flow along said flow path downstream of said transfer point,

(c) means for boosting the fluid pressure of the liquid flowing in said flow path at a boosting point downstream of said transfer point,

(d) means for substantially continuously communicating said successive removed volumes of solid particles entrained in liquid with said liquid of boosted fluid pressure flowing along said path downstream of the boosting point, said means for substantially continuously communicating said successive removed volumes of solid particles with said liquid of boosted fluid pressure comprising a rotor having two pairs of passageways therethrough, one passageway of each pair being disposed substantially perpendicular to the other passageway of said pair, and said passageways of one pair being offset substantially 45° from the passageways of the other pair, and means for continuously rotating said rotor.

4,187,044

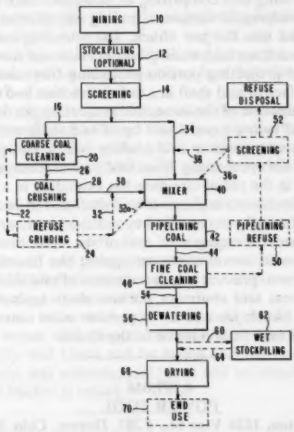
COAL SLURRY PIPELINING

Pierre J. Chassagne, San Mateo, Calif., assignor to Bechtel International Corporation, San Francisco, Calif.

Filed Apr. 26, 1978, Ser. No. 900,230

Int. Cl.² B65G *53/30*

U.S. Cl. 406—197 **6 Claims**



1. A method for preparing a mined ore having a broad spectrum of particle sizes for low energy slurry pipelining which comprises:

(a) dividing the ore into a first fine fraction and a coarse fraction;

(b) separating from said coarse fraction most of the refuse and grinding sufficient refuse to −200 mesh to augment the amount of −200 mesh required for a low energy pipeline slurry;

(c) crushing said coarse fraction to substantially the same particle distribution as said fine fraction to provide a second fine fraction;

(d) combining said first and second fine fractions, to form a combined fine fraction and mixing with sufficient −200 mesh refuse and water to provide a low energy mineral particle slurry at a combining site;

(e) pipelining said slurry to a destination;

(f) cleaning said combined fine fraction of refuse; and

(g) dewatering said cleaned combined fine fraction.

4,187,045

DRILLING ASSEMBLY AND A DRILLING TOOL THEREOF

Artur Fischer, Weinhalde 34, 7244 Waldachtal 3, Tumlingen, Fed. Rep. of Germany

Filed Nov. 22, 1978, Ser. No. 965,299

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1977, 2754383

Int. Cl.[2] B23B *31/12, 51/02*

U.S. Cl. 408—240 **6 Claims**

1. A drilling tool to be clamped in a jaw chuck of a drilling machine, which chuck has at least two jaws bounding slots therebetween and each having an end face and two lateral faces, the drilling tool comprising an elongated shaft having an axis, a circumferential surface, a trailing end portion arranged to be inserted into the jaw chuck, and a leading end portion axially spaced from said trailing end portion and having a tip; an elongated projecting portion projecting from said circumferential surface of said shaft in a radial direction and extending in an axial direction of the same, said projecting portion having a leading end facing toward said tip of said shaft; and an elongated abutment portion at said leading end of said projecting portion and also projecting from said circumferential surface of said shaft in the radial direction but extending in a direction which is transverse to said axis of said shaft and to said projecting portion laterally outwardly beyond the latter, so that said projecting portion engages in one of the slots between the chuck jaws with lateral abutment against the lateral faces of the latter so as to prevent relative rotation of said shaft and the chuck, whereas said abutment portion abuts against the end faces of the chuck jaws so as to prevent axial rearward displacement of said shaft relative to the chuck.

4,187,046

POWER TOOL

Henry Atherton, 1536 Vine St., #201, Denver, Colo. 80206

Filed Dec. 29, 1977, Ser. No. 865,745

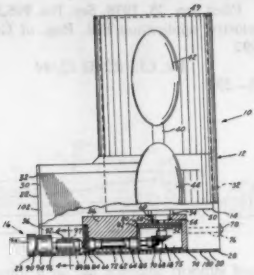
Int. Cl.[2] B27C *5/10*

U.S. Cl. 409—180 **18 Claims**

1. A power tool comprising:

cutter means driven by a motor for rotation about an axis for cutting a workpiece; and

guide means including a first guide surface arranged substantially parallel to the axis of said cutter means and approximately flush with the outer peripheral surface of said cutter means for supporting and guiding said cutter means relative to a first surface of the workpiece in a first operable position, a second guide surface arranged substantially perpendicular to the axis of the cutter means for supporting and guiding said cutter means relative to said first surface of the workpiece in a second operable position, said cutter means having a mounting end portion, the planes of said first and second guide surfaces intersecting at a point axially remote from said mounting end portion and defining an included angle therebetween, said mounting end portion being located substantially within said included angle, said mounting end portion projecting axially away from one side of said second guide surface, said cutter means further having a leading end portion having said cutting edge and projecting axially away from the opposite side of said second guide surface to precede said second guide surface in said axial direction, said first guide surface being delimited in the axial direction of said cutter means in a direction opposite to said mounting end portion of said cutter means by a plane substantially parallel to and substantially flush with said second guide surface, and a cylindrical guide surface mounted at one end of said cutter means remote from said second guide surface and having an outside diameter approximately equal to the diameter of the outer peripheral cutting edge of said cutter means for contacting a second surface of the workpiece for guiding the cutter means and limiting the movement of the cutter means from passing into the plane of the second surface of the workpiece in said second operable position.



4,187,047

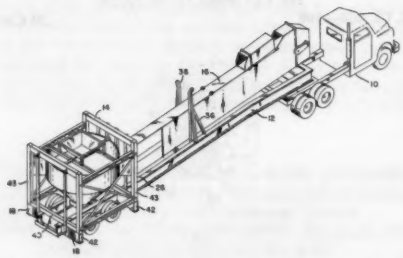
SYSTEM AND APPARATUS FOR ERECTING A PORTABLE SILO AND ELEVATOR STRUCTURE

Edmond C. Squifflet, Sr., Issaquah, Wash., assignor to Boeing Construction Equipment Company, Seattle, Wash.

Filed Mar. 9, 1978, Ser. No. 884,931

Int. Cl.[2] B60P *1/00*

U.S. Cl. 414—332 **4 Claims**



1. A portable self-erecting folded up silo and elevator structure carried on a trailer, comprising in combination:

(a) A trailer bed carrying a silo with telescoping legs, said telescoping legs extending downwards adjacent said trailer bed;

(b) hinge plate mounting bracket means, comprising a first hinge plate and a second hinge plate, hingeably connected by a hinge bolt, operatively connected by said first hinge plate to each of said telescoping legs and mounted by said second hinge plate to said trailer bed, for securing said silo structure to said trailer bed for portable and self-erecting purposes;

(c) an elongated elevator structure disposed on said trailer bed and secured thereon by one pivot hinge means at said elevator bottom side adjacent said silo structure and for pivoting said elevator in upright position next to and adjacent with said silo structure when said silo structure is erected by telescoping said silo legs in expanded condition;

(d) actuator means mounted on said silo structure for raising said silo structure through expansion of said telescoping legs and said actuator means provided with remounting attachment means on one end for connection from said silo to said elevator for raising said elevator about said pivot hinge means, and

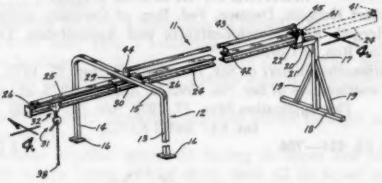
(e) support means for mounting and supporting said silo telescoping legs extending downwards adjacent said trailer bed onto ground surface.

4,187,048

LOADING AND UNLOADING APPARATUS FOR A VAN

Orville R. Bohlmann, Box 369, Denison, Iowa 51442

Filed Feb. 22, 1978, Ser. No. 880,193
Int. Cl.[2] B60P 1/00
U.S. Cl. 414—542 **3 Claims**



1. An apparatus for loading and unloading heavy objects to and from a van having a loading door opening therein, comprising:

a U-shaped framework having a central portion, a first leg portion connected to one end of the central portion and extending to the floor of the van and a second leg portion connected to the other end of said central portion and extending to the floor of the van, said U-shaped framework being positioned adjacent to said van loading door opening whereby said legs are positioned on each side of said van loading door opening;

a support post in abutment with the floor of the van at the bottom thereof and extending upwardly;

an elongated beam being I-shaped in cross-section;

means for slideably attaching said beam to a top portion of said support post including a sleeve means for receiving said beam and allowing the beam to slide within said sleeve means;

support means connected to the top of said sleeve means and to the top of the central portion of the U-shaped member for stabilizing said apparatus.

means for slideably attaching said beam to the central portion of said U-shaped member;

winch means connected to said beam for selectively raising heavy objects towards said beam and lowering said heavy objects away from said beam, including means for attaching an object to be lifted to said winch means;

roller means for attaching said winch means to said beam for allowing said winch to be moveable along said beam; and

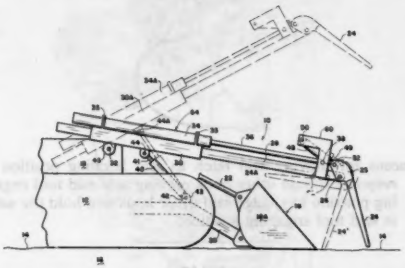
stop means connected to said beam for allowing movement of said beam with respect to said framework between a first position whereby said beam extends out of said van loading door opening to a second position whereby said beam is located entirely within said van.

4,187,049

GATHERING BLADE APPARATUS FOR ASSISTING IN LOADING THE BUCKET ON A FRONT-END LOADER

Fred E. Jones, Rte. 4, Box 50 D, Tulsa, Okla. 74354

Filed Jun. 24, 1977, Ser. No. 809,635
Int. Cl.[2] E02F 3/81
U.S. Cl. 414—704 **2 Claims**



1. A gathering blade apparatus for attachment to a vehicle having an earth-moving bucket supported by longitudinal operating arms, of conventional design, comprising;

(a) a gathering blade comprising a blade positioned transverse to the longitudinal axis of the vehicle, by hinge means near its top edge, to a pair of spaced-apart, parallel blade support arms;

means to rotate the plane of said gathering blade a selected angle from forward of the vertical, to substantially horizontal, under said blade support arms, the transverse length of said blade being less than the transverse length of said bucket;

(b) a pair of guide means supported by horizontal hinge means to said vehicle, and extending parallel to the longitudinal axis of said vehicle, said guide means adapted to receive and to longitudinally guide said blade support arms;

(c) a pair of hydraulic cylinders and pistons attached to said guide means, and piston rod means, attached at their outer ends to the outer ends of said blade support arms; whereby operation of said piston serves to move said support arms and said blade between positions forwardly or rearwardly, with respect to said bucket;

(d) means to rotate said guide means about said horizontal hinge means with respect to said bucket operating arms; whereby said blade can be raised and lowered independently; and wherein, said blade will be raised whenever said bucket is raised.

4,187,050

QUICK-DISCONNECT MECHANICAL COUPLING

Gail G. Barbee, Montgomery, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 15, 1978, Ser. No. 878,140
Int. Cl.[2] E02F 3/70
U.S. Cl. 414—723 **10 Claims**

1. A quick-disconnect coupling for affixing tools to a powered arm or the like, comprising:

a base;

means on said base for affixing the same to an arm or the like;

a pair of hooks having facing openings;

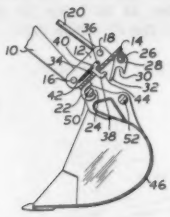
means immovably mounting one of said hooks on said base;

means movably mounting the other hook on said base for movement between tool engaging and tool disengaging positions;

a latch movably mounted on said base and engageable in a latching position with said other hook for preventing movement thereof from said tool engaging position;

cooperating means on said other hook and said latch for moving said latch out of said latching position as said

other hook moves from said tool disengaging position toward said tool engaging position; and



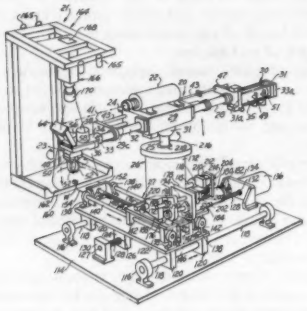
means for moving said latch to said latching position in response to said other hook moving into said tool engaging position to engage said other hook and hold the same in said tool engaging position.

4,187,051

ROTARY VIDEO ARTICLE CENTERING, ORIENTING AND TRANSFER DEVICE FOR COMPUTERIZED ELECTRONIC OPERATING SYSTEMS

Jerry Kirsch, and Kerry F. Kirsch, both of 36 Beacon Hill, Grosse Pointe Farms, Mich. 48236

Filed May 26, 1978, Ser. No. 910,136
Int. Cl.[2] B25J 9/00
U.S. Cl. 414—744 **12 Claims**



1. A rotary video article centering, orienting and transferring machine adapted to be installed in a computerized electronic operating and control system with a memory section therein and operable to transport articles from a loading station to an unloading station outside said machine, said machine comprising

an article carrier disposed at the loading station,

a machine-supporting structure adapted to be disposed between said stations,

a first X-Y axis positioner including

a first X-axis carriage mounted on said structure for horizontal reciprocation longitudinally of said article carrier and

a first Y-axis carriage mounted on said X-axis carriage for horizontal reciprocation laterally of said X-axis carriage,

means for so reciprocating said first X-axis and said first Y-axis carriages,

a lifting and horizontally swinging device mounted on said first Y-axis carriage,

an article transporter mounted on said device for lifting and swinging thereby and having an article gripper connected thereto and movable thereby between the loading and unloading stations,

a first video camera mounted in optical alignment with said article carrier for rotation around its optical axis and having a focal plane disposed in focus with said article carrier for imaging articles thereon in said focal plane,

said first video camera having means thereon adapted for the electrical connection thereof to the computerized electronic operating and control system for transmitting the image of a randomly-positioned article on said carrier in said focal plane to the operating and control system for comparison with the image of a previously-properly-positioned article on said article carrier previously recorded in the memory section,

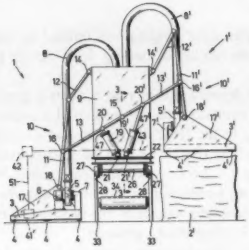
and means responsive to the bringing of the video camera image of the randomly-positioned article on said workpiece carrier into coincidence with the image in the memory section of the computerized electronic operating and control system for rotating said first video camera and moving said X-axis carriage and said Y-axis carriage to move said artic½ gripper into a position adjacent the randomly-positioned article for pickup thereof.

4,187,052

METHOD OF OPENING BALES

Herbert Hergeth, Dulmen, Fed. Rep. of Germany, assignor to Hergeth KG. Maschinenfabrik und Apparatebau, Dulmen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 890,215, Mar. 27, 1978, which is a continuation of Ser. No. 609,923, Aug. 12, 1975, abandoned. This application Mar. 27, 1979, Ser. No. 24,250
Int. Cl.[2] B65G 65/02
U.S. Cl. 414—786 **3 Claims**



1. A method of removing a generally uniform layer portion of fibrous material from the top of a bale of compressed fibrous material and loosening the fibers of the layer portion during the removal thereof comprising the steps of providing a bale of relatively compressed fibrous material having a predetermined upper surface area, providing a suction hood having an overall area corresponding in size generally to the upper surface area of the fibrous bale, creating at least two spaced linear areas of suction across the overall area of the hood while preventing the creation of suction between the two linear suction areas, positioning the suction hood in overlying contiguous relationship to the bale upper surface area whereby the suction draws the fibrous material upwardly across the overall area and loosens the compressed condition thereof to a generally fluffed state through a uniform depth thereof, raising the suction hood to remove a generally uniform depth of the loosened fibrous material across generally the entirety of the predetermined surface area, and subsequently discontinuing the suction to release the loosened fibrous material layer portion from the suction hood for subsequent processing.

4,187,053

CENTRIFUGAL PUMP

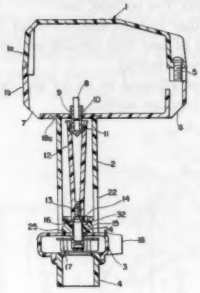
Norbert Tunze, Seeshaupter Str. 68, 8122 Penzberg, Fed. Rep. of Germany

Filed Jul. 29, 1977, Ser. No. 820,283

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1976, 7623892[U]

Int. Cl.[2] F04B *17/00*

U.S. Cl. 415—111 **8 Claims**



1. The combination which includes

(a) a motor housing **1**,

(b) an impeller housing **3** containing an impeller **17**,

(c) a hollow shaft tube **2** extending downwardly from said motor housing **1** to the upper surface of said impeller housing **3**, said shaft tube having an annular inward projection on its lower interior surface,

(d) a drive shaft **12** extending centrally down through said hollow shaft tube **2**,

(e) a metallic impeller arbour **14** having its upper end connected to the lower end of drive shaft **12** its lower end connected to said impeller **17**, and an intermediate portion extending downwardly through said impeller housing **3**,

(f) a bearing flange **15**,

(1) having a central inner opening surrounding the said intermediate portion of said metallic impeller arbour **14**,

(2) having an outer circumferential surface that is press fitted against the inner side surfaces of the lower end of said shaft tube **2**, said outer circumferential surface having an arresting groove that engages said annular inward projection on the lower interior surface of said shaft tube **2**,

(3) having an under side that is press fitted into the upper surface of said impeller housing **3**, and

(g) an antifriction thrust bearing **16** and a steel spacer **32** extending between the lower end of said drive shaft **12** and a portion of the upper surface of said bearing flange **15** whereby one lower face of the drive shaft **12** rests downwardly against said spacer which in turn rests against said antifriction thrust bearing.

4,187,054

TURBINE BAND COOLING SYSTEM

Delmer H. Landis, Jr., Loveland; Paul W. Lozier, North Bend; Louis Lievestro, West Chester; Thomas A. Auxier, and John H. Starkweather, both of Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

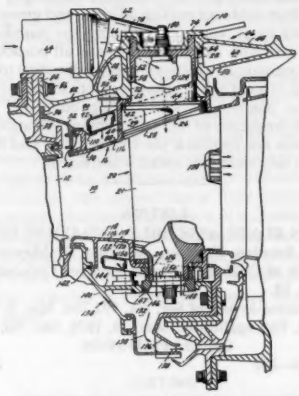
Filed Apr. 20, 1978, Ser. No. 898,061

Int. Cl.[2] F01D *5/18, 9/04*

U.S. Cl. 415—115 **10 Claims**

1. A gas turbine comprising a number of annular wall sectors forming a complete circular wall having first and second faces, the first face bounding a hot gas passage and the second face defining a radially inner portion of an annular chamber; a plurality of hollow impingement vessels disposed in a circular array within said chamber, means for introducing cooling fluid into said impingement vessels and means for directing cooling fluid from said vessels into impingement against the second face to provide cooling thereof;

said turbine further comprising a plurality of variable area vanes each having an airfoil portion and a trunnion ex-



tending through said wall sectors and journaled for rotation within said annular chamber, and wherein said impingement vessels are contoured to fit between adjacent vane trunnions to provide impingement cooling of those portions of the second face between adjacent vanes.

4,187,055

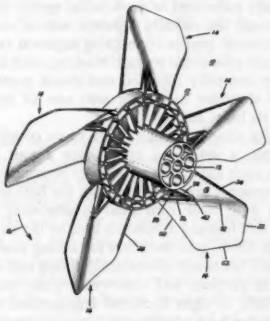
FLEXIBLE FAN

John W. Barnstead, Kokomo, Ind., assignor to Vernco Corporation, Columbus, Ind.

Filed Apr. 3, 1978, Ser. No. 892,658

Int. Cl.[2] F04D *29/38*

U.S. Cl. 416—132 A **17 Claims**



1. In a flexible fan which automatically reduces its pitch in response to increased rotational speed and comprises a hub having an axis of rotation and a plurality of blades extending radially outwardly therefrom; each blade having a leading surface, a root portion joined to said hub, a tip portion, leading and trailing edges, and a relatively stiff leading portion joined to a relatively flexible trailing portion by a relatively narrow hinge zone which extends diagonally across the blade from generally the trailing edge of said root portion to generally the leading edge of said tip portion, said leading portion being defined by said hinge zone, root portion and leading edge and said trailing portion being defined by said hinge zone, tip portion and trailing edge, the pitch of each blade at rest being substantially greater at said tip portion than at said root portion

thereof; each blade having a mode of vibration about said hinge zone the frequency of which increases as the rotational speed of the fan increases, and a second mode of vibration about a line generally perpendicular to said hinge zone; the improvement comprising a stiffening portion on said leading surface of said leading blade portion of each blade extending outwardly from said root portion adjacent and generally parallel with said hinge zone for stiffening the junction of said trailing portion with said hinge zone and all portions of each blade lying substantially forwardly in the direction toward said leading edge of a radial line extending from said axis of rotation through the junction of said trailing edge and said hub whereby the frequency of said second mode vibration is higher than and does not approach the frequency of said first mode vibration as said rotational speed is increased.

4,187,056

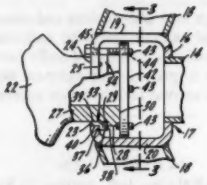
FAN BLADE ASSEMBLY AND COUPLING

Joseph M. Schwinn, Windsor, and Tony E. Maynard, Santa Rosa, both of Calif., assignors to Ecodyne Corporation, Lincolnshire, Ill.

Continuation-in-part of Ser. No. 792,740, May 2, 1977, abandoned. This application Mar. 29, 1978, Ser. No. 891,220

Int. Cl.[2] F04D *29/36*

U.S. Cl. 416—207 **27 Claims**



1. A fan blade assembly comprising:

(a) a hub adapted to be connected to a power driven shaft, a plurality of radial spokes extending outwardly from said hub, a hollow coupling housing attached on one side to the radially outer end of each radial spoke, there being a hole through the radially opposite side of each housing, circumferential spokes connecting adjacent radial spokes;

(b) a fan blade connected to each housing, each blade having a radially inwardly directed end shank portion with an enlarged shoulder extending into one of said housings through its hole; and

(c) means for attaching each blade to its coupling housing comprising, a split ring comprising a pair of separate members each having an outwardly protruding rim, each pair of members extending through the hole in one of said housings with their rims held in abutment against the inside of said housing around its hole by the shoulder of its associated blade, said members encircling said shank portion of such blade and substantially filling said hole around said shank portion, and removable yoke means in said housing held in tight frictional engagement against said shank portion by a plurality of fasteners passing through apertures located in said housing and being adjustably connected to said yoke means.

4,187,057

PERISTALTIC INFUSION PUMP AND DISPOSABLE CASSETTE FOR USE THEREWITH

Piritheous Xanthopoulos, Cupertino, Calif., assignor to Stewart-Naumann Laboratories, Inc., Santa Clara, Calif.

Filed Jan. 11, 1978, Ser. No. 868,525

Int. Cl.[2] F04B *43/12, 45/08;* A61M *5/00*

U.S. Cl. 417—63 **14 Claims**

1. A disposable cassette for use in a peristaltic pump which includes means defining a cassette support surface for supporting the cassette between a first inoperative position and a second operative position and vertically extending guide tracks located on opposite sides of said surface and extending between said inoperative and operative positions, said disposable cassette comprising:

(a) a tubular arrangement including

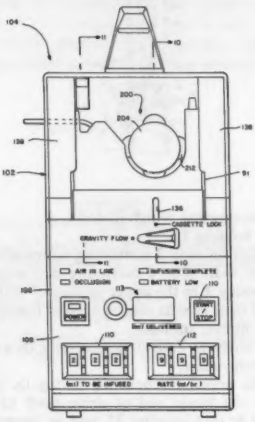
(i) a flexible first tubular section having opposite end portions and an intermediate portion joining said end portions,

(ii) a second tubular section distinct from but joined with one end of said first section, and

(iii) a third tubular section distinct from but joined with the other end of said first tubular section; and

(b) a cassette body including

(i) surface means adapted to sit on and be supported by said cassette support surface,



(ii) an arcuate tube supporting surface located above said surface means, having a predetermined radius of curvature, and being readily accessible along its length from the top of said cassette body,

(iii) first and second means for fixedly supporting the opposite end portions of said first tubular section in place adjacent the opposite ends of said tube supporting surface, said first and second supporting means together fixing said intermediate portion of said first tubular section in place entirely across and in continuous contact with said tube supporting surface, and

(iv) first and second guide members on opposite sides of said surface means and extending out beyond said first and second tube supporting means, said first and second guide members being adapted to cooperate with said guide tracks whereby to guide said cassette between said inoperative and operative positions.

4,187,058

PORTABLE AIR COMPRESSOR

Darrell D. Fish, Timonium, Md., assignor to Universal Security Instruments, Inc., Owings Mill, Md.

Filed Jun. 22, 1978, Ser. No. 917,936

Int. Cl.[2] F04B *21/00*

U.S. Cl. 417—234 **5 Claims**

1. A portable device for inflating inflatables, comprising:

a housing having front and rear walls of generally triangular configuration, and left, right and bottom walls extending between said front and rear walls;

a dividing wall subdividing the interior of said housing into upper and lower compartments;

an air compressor;

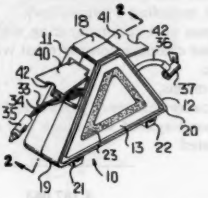
a drive motor for said air compressor, said drive motor being operable when energized with twelve volts direct current;

means mounting said air compressor and said drive motor in said lower compartment;

a pair of electrical leads for supplying energizing voltage to said motor and extending from said motor through a suitable provided opening in said dividing wall into said upper compartment;

adapter plug means connected to the ends of said electrical leads remote from said motor and adapted for insertion into a standard cigarette lighter socket of a vehicle;

a hose for delivering pressurized air from said air compressor and extending therefrom through a suitably provided opening in said dividing wall into said upper compartment, said hose being terminated at a nozzle connector which is adapted to supply air to a standard automobile tire inflation stem;



at least one selectively movable access panel provided in at least one of said left and right walls at said upper compartment to permit said electrical leads and said hose to be extended outside of said housing; and

reflective means in the shape of the outline of a triangle secured to the outer surface of at least one of said front and rear walls;

wherein said upper compartment is sufficiently large to contain said electrical leads, said adapter plug means, said hose and said nozzle connector when said device is not in use.

4,187,059

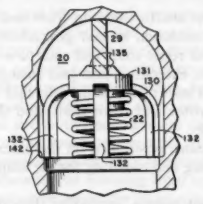
VALVE GUIDE FOR POPPET VALVE

Curtis J. Parker, Orangefield, and Kenneth H. McGill, Beaumont, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Continuation of Ser. No. 599,285, Jul. 25, 1975, abandoned. This application Mar. 16, 1978, Ser. No. 887,285

Int. Cl.[2] F04B *39/14*

U.S. Cl. 417—454 **2 Claims**



1. In a reciprocating pump having a housing with a piston reciprocatingly mounted in one end of a pumped fluid chamber, an inlet passageway to said fluid chamber, an outlet passageway from said fluid chamber and a spring biased normally closed intake valve member mounted at the juncture of said inlet and said pumped fluid chamber and having a stem extending from said valve member into said pumped chamber with a spring positioned around said stem, an improved inlet valve mounting assembly, comprising:

a ledge formed in said housing around and radially outward of said intake valve at the juncture of said inlet passageway at said pumped fluid chamber;

a support plate extending across said inlet passageway, three legs mounted on said support plate and extending therefrom in a tripod relation with end portions of said legs resting on said ledge, said support plate having a guide passage therein to slidably receive and guide said valve stem;

a support bar mounted between said support plate generally aligned with said guide passage and an inner wall of said pumped fluid chamber and generally longitudinally aligned with said piston, said support bar being forcibly slid between said support plate and said inner wall to hold said support plate in tight engagement with said ledge; and

means to secure said support bar in fixed position between said support plate and said inner wall including a shoulder on said support bar mounted in a housing recess adjoining said pumped fluid chamber between said recess and a bore plug which is removably mounted in said housing at said pumped chamber in general longitudinal alignment with said piston.

4,187,060

LIQUID FUEL INJECTION PUMPS

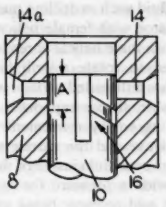
Arthur J. Ellis, Cheltenham, and Alan Howarth, Churchdown, both of England, assignors to Lucas Industries Limited, Birmingham, England

Filed Feb. 7, 1978, Ser. No. 875,786

Claims priority, application United Kingdom, Apr. 30, 1977, 18174/77

Int. Cl.[2] F04B *7/04;* F02M *59/44*

U.S. Cl. 417—490 **6 Claims**



4. A liquid fuel injection pump of the kind comprising a reciprocal pumping plunger, a cylinder in which the plunger is slidable, the plunger extending from one end of the cylinder, means for effecting reciprocation of the plunger, a pair of ports formed in the wall of the cylinder, a fuel supply channel communicating with said ports, said ports being uncovered by said plunger as the plunger moves outwardly towards its outermost position to allow fuel into said cylinder, said ports being gradually covered by said plunger during the inward movement thereof, an outlet from the other end of said cylinder and through which fuel is displaced from the cylinder during further inward movement of the plunger after the ports have been covered, groove means defined in the plunger for registration with one of said ports towards the end of said further movement, the registration of said groove means with said one port terminating the flow of fuel through said outlet and allowing fuel to flow from the cylinder through said one port, this fuel flow acting to displace any cavities in the fuel within the one port into the supply channel, characterized by channel means which communicates with the cylinder and with said other port following the covering of said other port by the plunger, said channel means allowing a limited flow of fuel from said cylinder to flow through said other port to displace any cavities in the fuel in the other port into the supply channel before the ports are uncovered again by the plunger.

4,187,061

ROTARY HELICAL FLUID MOTOR WITH DEFORMABLE SLEEVE FOR DEEP DRILLING TOOL

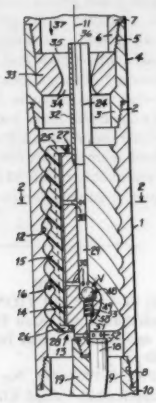
Rainer Jürgens, Altencelle, Fed. Rep. of Germany, assignor to Christensen, Inc., Salt Lake City, Utah

Filed Apr. 27, 1978, Ser. No. 900,428

Claims priority, application Fed. Rep. of Germany, May 5, 1977, 2720130

Int. Cl.[2] **F01C** *1/10, 5/02;* **F03C** *3/00;* **E21B** *3/12*

U.S. Cl. 418—48 **17 Claims**



2. In a progressing cavity fluid motor for driving a drill bit for deep drilling tools adapted to be mounted on a drill string and powered by a fluid such as drilling mud, said motor including a housing, a stator with female helical threads within the housing, a rotor with male helical threads inserted within the stator and mounted to rotate a drill bit, the improvement wherein the rotor has a threaded surface which is formed of an elastically deformable sleeve supported by a carrier shaft, means for preventing rotary movement between said elastically deformable sleeve and the carrier shaft, and means for introducing a pressure medium inside of the elastically deformable sleeve to provide a pressure for expanding said sleeve radially outwardly, said pressure being greater than the fluid pressure existing in the working cavity between the facing surfaces of the male and female threads.

4,187,062

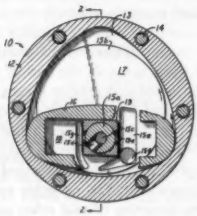
BYPASS ROTARY GAS EXPANSION MOTOR

Earl W. Traut, 8040 Palm Lake Dr., Orlando, Fla. 32811

Filed Jul. 17, 1978, Ser. No. 925,642

Int. Cl.[2] **F01C** *1/02, 21/12*

U.S. Cl. 418—61 B **4 Claims**



1. A rotary gas expansion motor comprising:
a generally triangular chamber,
an elongate rotor,
said rotor being rotatable end-over-end inside said chamber and serving to divide same into two compartments,
a shaft with crank,
a sliding block,
said sliding block surrounding said crank and being rotatable thereupon,
said crank and said block extending into a slot in said rotor and serving to divide said slot into two cells,
said crank including a hole which communicates with a gas inlet in said motor and with a hole in said block during part of the rotation of said block, to admit gas to one of said slot cells as same is increasing in size,
a disk,
said disk being coaxially affixed to said shaft adjacent said chamber and said rotor,
said disk including a bypass port,
said bypass port communicating with one said slot cell and one said chamber compartment when both are increasing in size,
exhaust means,
so as to cause charges of pressurized gas entering said motor to expand against said block and said rotor before being exhausted.

4,187,063

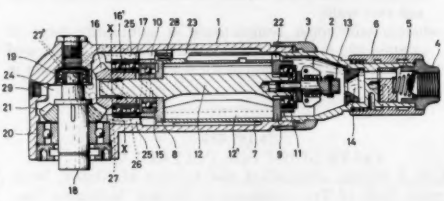
AIR MOTOR WITH DISCHARGE THROUGH GEAR CHAMBER AND SILENCER

Dan Yoshida, Osaka; Tatsumi Onaka, Amagasaki, and Yasuhiro Horiuchi, Ikoma, all of Japan, assignors to Fuji Kuuki Kabushiki Kaisha and Hitachi Zosen Kabushiki Kaisha, both of Osaka, Japan

Filed Nov. 10, 1977, Ser. No. 850,488

Int. Cl.[2] **F01C** *13/02, 21/04, 21/06*

U.S. Cl. 418—90 **1 Claim**



1. An air motor comprising:
a casing having therein a rotor chamber and a gear chamber;
a rotor positioned within said rotor chamber and having a rotor shaft;
a power output shaft extending from said casing;
gear means, positioned in said gear chamber, for drivingly coupling said rotor shaft and said power output shaft;
air inlet means, extending into said casing, for admitting air containing a mist of lubricant into said motor chamber to rotate said rotor and rotor shaft, and thereby said power output shaft;
air silencer means, positioned on the exterior of said casing, for exhausting and muffling the air employed for rotating said rotor;
first passageway means, extending directly from said rotor chamber to said air silencer means, for passing a first portion of said air directly from said rotor chamber to said air silencer means; and
second passageway means, extending from said rotor chamber to said gear chamber and then from said gear chamber to said air silencer means, for passing a second portion of said air from said rotor chamber to said gear chamber, for therein cooling and lubricating said gear means, and for then passing said second portion of said air to said air silencer means, said second passageway means comprising at least one inlet hole extending through said casing from

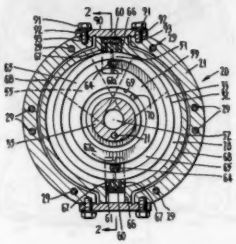
said rotor chamber to said gear chamber and at least one outlet hole extending through said casing from said gear chamber to said air silencer means.

4,187,064

ROTARY MACHINE

Colin Wheeler, 14 Hope Rd., Applecross, Australia (6153)

Filed Aug. 18, 1977, Ser. No. 825,787
Claims priority, application Australia, Aug. 19, 1976, PC7062
Int. Cl.[2] F04C *27/00*
U.S. Cl. 418—187 **11 Claims**



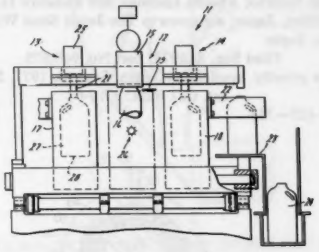
1. A rotary machine including an outer housing, an annular surface in said housing and having a longitudinal axis, at least one rotor in said housing and rotatable about an axis coincident with the annular surface, said rotor having an outer surface including at least one sealing portion disposed in close sealing relation with the annular surface, said rotor surface having convexly curved cam surface portions on either side of said at least one sealing portion, said cam surface portions each merging into a segmental surface portion of the rotor surface concentric with the annular surface, at least two sealing members supported upon said housing and equally spaced around the annular surface, each said sealing member having a surface confronting said rotor outer surface and forming a sealing surface, said sealing surface being complementary to the segmental surface portion of said rotor for sealing engagement therewith, said sealing surface being non-complementary to the sealing portion and the cam surface portions of said rotor, means causing each said sealing member to move to position its sealing surface in sealing engagement with the segmental surface portion of said rotor when adjacent thereto, an inlet passage opening to the outer surface of said rotor predominantly through a cam surface portion and partly through a segmental surface portion on one side of said at least one sealing portion, an exit passage opening to the outer surface of said rotor predominantly through a cam surface portion and partly through a segmental surface portion on the other side of said at least one sealing portion, said inlet and exit passages communicating with ports for admitting working fluid to and exhausting working fluid from said housing, respectively, the length of the inlet and outlet passage openings at the outer rotor surface, when measured in the direction of rotor rotation, being greater than the length of the sealing surface for each said sealing member, whereby said inlet and outlet passages are continuously open to a respective working space between the rotor and the housing thereby maintaining substantially continuous and constant admission and exhaustion of working fluid during rotation of said rotor, the distance between the leading end of the opening of a said outlet passage and the trailing end of the opening of the inlet passage on the opposite side of the intervening segmental surface being greater than the distance between any pair of adjacent sealing members, whereby the inlet and outlet passages on either side of the intervening segmental surface portion will not be simultaneously open to the same working space between the pair of sealing members, the length of the at least one sealing portion of said rotor, when measured in the direction of rotor rotation, being greater than the length of the sealing surfaces for each sealing member, each said sealing member having at least one port therethrough opening through said sealing surface at one end and into a space within said housing at the surface of said sealing member opposite said sealing surface, whereby when each said sealing member is in sealing engagement with a majority of a said segmental surface portion of said rotor there will be no fluid flow through said port, but when each said sealing member is aligned with an inlet or outlet passage opening, including that part of the opening through said segmental surface portion, fluid flow occurs through said port to equalize fluid pressure at said sealing surface and said opposite surface of said sealing member.

4,187,065

BLOW MOLDING MACHINE

Julio C. Perez, Saline, Mich., assignor to Roman Machine Co., Milan, Mich.

Filed Mar. 20, 1978, Ser. No. 890,623
Int. Cl.[2] B29C *17/07*
U.S. Cl. 425—136 **8 Claims**



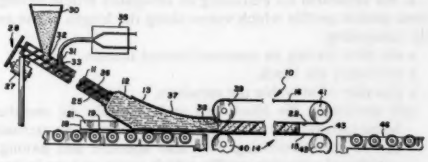
1. In a blow molding machine of the type having a continuous parison extruder station, a blow molding station, mold halves movable between said parison and blow molding stations, means for moving said mold halves, control means for said moving means parison sensing means actuatable in response to a descent of a parison to a predetermined point for actuating said control means, and means for detaching said parison, the improvement comprising a timer, means responsive to completion of a parison for starting said timer, means responsive to running out of said timer before actuation of said parison sensing means by the next parison for disenabling said blow molding machine, and means responsive to actuation of said parison sensing means by the next parison before said timer has run out for setting and stopping said timer.

4,187,066

APPARATUS FOR THE PREPARATION OF DISPLAY BLOCKS OF UREA FORMALDEHYDE FOAM

John A. Hobson, Minneapolis, and Paul K. Schilling, St. Paul, both of Minn., assignors to H & S Industries, Inc., St. Paul, Minn.

Filed Oct. 7, 1977, Ser. No. 840,225
Int. Cl.[2] B29D *27/00*
U.S. Cl. 425—327 **4 Claims**



1. Apparatus for the continuous preparation of frothed thermosetting plastic resinous products including:

(a) extruder means having an auger confined within a barrel

and defining an extruder chamber, and first and second feed inlets to said chamber, and an outlet from said chamber;

(b) chamber means defining a surge chamber in communication with the outlet from said extruder chamber, and the outlet from said extruder chamber to said surge chamber having a cross-sectional area which is significantly less than the cross-sectional area of said surge chamber;

(c) an elongated expansion chamber in communication with the outlet from said surge chamber, said expansion chamber having a cross-sectional area which decreases generally uniformly and gradually by approximately 25% along substantially the entire length thereof, and having a product extrusion outlet at the end thereof; and wherein:

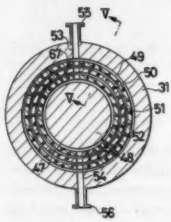
(d) the outlet from said expansion chamber has a cross-sectional configuration substantially as desired in the final frothed thermosetting plastic resinous product.

4,187,067

DIE FOR PRODUCING PLASTIC RESIN PELLETS

Haruyuki Mizuno; Atsushi Idemoto, and Kunihiro Horie, all of Hiroshima, Japan, assignors to The Japan Steel Works, Ltd., Tokyo, Japan

Filed Sep. 8, 1978, Ser. No. 940,675
Claims priority, application Japan, Sep. 13, 1977, 52-109481
Int. Cl.[2] B29C *17/14*
U.S. Cl. 425—313 **10 Claims**



1. A plastic resin die for the production of pellets comprising;

an outer sleeve, said outer sleeve having a pair of ports extending through said sleeve, an inner body disposed coaxial with said outer sleeve, said outer sleeve and inner body defining an annular space therebetween, a plurality of annular rings assembled in said annular space, each of said annular rings having at least one nozzle extending in the axial direction and at least one groove formed in one wall portion to define at least one annular jacket, wherein said ports are in communication with said annular jacket.

4,187,068

VARIABLE PROFILE EXTRUSION APPARATUS

Clyde W. Vassar, Winooski, Vt., assignor to W. James Kemerer, Long Beach, Calif., a part interest

Filed Jul. 5, 1977, Ser. No. 815,699
Int. Cl.[2] B29F *3/04*
U.S. Cl. 425—381 **26 Claims**

1. An apparatus for extruding an elongated article having a cross section profile which varies along the length of the article comprising:

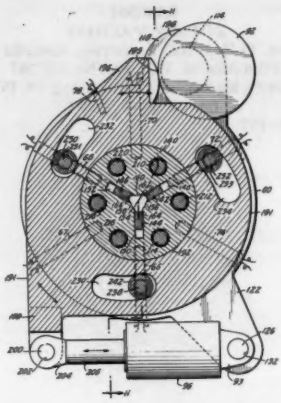
a die plate having an aperture formed therein,

a stationary die block,

a plurality of movable die members,

said stationary die block and said movable die members being mounted on said die plate and forming an extrusion orifice communicating with said aperture and having a peripheral extrusion profile which varies as seen in cross section with movement of said movable die members,

means for forcing an extrudate stock through said aperture and through said orifice to form an elongated extrudate article having a cross sectional profile conforming at each moment to the cross sectional profile of said orifice at the moment when said extrudate stock is being forced through said orifice, and



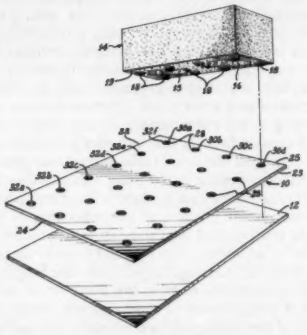
means for causing the simultaneous movement of each of said movable die members during the passage of stock extrudate through said orifice for providing a varying peripheral orifice profile.

4,187,069

COMBINATION DIE AND PALLET ASSEMBLY

Wayne L. Mullins, 5001 E. Cactus, Scottsdale, Ariz. 85254

Filed Oct. 2, 1978, Ser. No. 947,452
Int. Cl.[2] B28B *1/14*
U.S. Cl. 425—470 **6 Claims**



1. A combination die and pallet assembly upon which mortarless interlocking cementitious blocks are cast and subsequently transported, said combination die and pallet assembly comprising:

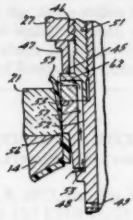
(a) a die and pallet plate having top and bottom planar surfaces, said die and pallet plate formed of solid heavy gage metal having a thickness dimension of at least one-quarter inch and having a plurality of apertures formed therethrough with those apertures arranged in a predetermined array; and

(b) a backing plate of planar configuration in contiguous engagement with the bottom planar surface of said die and pallet plate during block casting operations and separable therefrom for subsequent block transport.

4,187,070
BLOW MOLDING MACHINE

Merritt W. Martin, Jr., Saline, Mich., assignor to Roman Machine Co., Milan, Mich.

Filed Mar. 20, 1978, Ser. No. 890,626
Int. Cl.[2] B29C *17/07*
U.S. Cl. 425—525 7 Claims

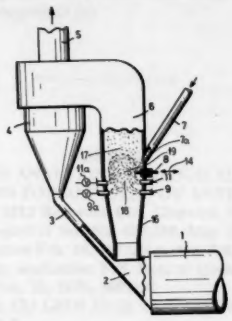


1. A blow molding machine for a product such as a bottle having a neck, comprising a pair of mold sections which together form a cavity and at their upper ends an annular blow pin assembly receiving surface, said surface being flared upwardly in the direction of the blow pin assembly, and a downwardly extending blow pin assembly above said mold sections having actuating means for moving it downwardly to enter said flared surface and a lower portion adapted to fit within said mold cavity so as to form the inside surface of the product neck, a wider portion on said blow pin assembly above said lower portion, and a sharp shoulder between said portions, the diameter of said shoulder being such that when said blow pin assembly enters said flared surface the outer edge of said shoulder will engage said flared surface with an interference fit, thereby completely severing the neck portion of the product from the flash thereabove, said blow pin assembly further comprising a blow pin having a central compressed air passage, and a shear ring mounted on said blow pin for limited lateral movement, the internal diameter of said shear ring being sufficiently wider than the blow pin diameter to permit the shear ring to have a self-centering action when the blow pin assembly descends, means longitudinally retaining said shear ring on said blow pin so as to permit said self-centering action, said shoulder being formed on said shear ring.

4,187,071
METHOD FOR THE TREATMENT OF FINELY GRAINED MATERIAL, PARTICULARLY FOR THE PRECALCINING OF CEMENT

Kunibert Brachthäuser, Bensberg; Hubert Ramesohl, Bensberg-Refrath; Klaus Beisner, Hoffnungsthal, and Horst Herchenbach, Troisdorf, all of Fed. Rep. of Germany, assignors to Klöckner-Humboldt=Deutz Aktiengesellschaft, Fed. Rep. of Germany

Division of Ser. No. 665,327, Mar. 9, 1976, Pat. No. 4,066,470. This application Sep. 14, 1977, Ser. No. 833,231
Claims priority, application Fed. Rep. of Germany, Mar. 10, 1975, 2510312
Int. Cl.[2] F27B *15/00*
U.S. Cl. 432—106 3 Claims



1. A structure for thermally treating material such as for the calcining of cement, comprising in combination:

a rotary kiln,

at least one cyclone separator heat exchanger having a solids discharge and an inlet gas conduit,

a standpipe connecting said rotary kiln to the solids discharge of said cyclone separator,

means for directing a controlled amount of fuel and oxidizing gas into said standpipe to provide a spatially limited preoxidation zone therein,

means in said standpipe providing an admixing zone immediately above said preoxidation zone,

feed means for injecting raw material directly into said admixing zone for admixture with the partially oxidized gas emanating from said preoxidation zone,

means in said standpipe providing a precalcining zone between said admixing zone and the inlet gas conduit of said cyclone separator,

movable deflector means between said preoxidation zone and said precalcining zone, said deflector means being sufficiently porous to adjustably permit partially oxidized gases to flow from said preoxidation zone into said precalcining zone but preventing heavy particles from falling from said feed means into said preoxidation zone, and

means for discharging precalcined particles from said cyclone separator into said rotary kiln.

CHEMICAL

4,187,072

GELLED NONPIGMENTED WOOD STAINS

Julio A. Fernández, Caledon, Canada, assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Dec. 14, 1978, Ser. No. 969,690
Claims priority, application Canada, Apr. 14, 1978, 301204
Int. Cl.[2] B27K *5/02*
U.S. Cl. 8—6.5 6 Claims

1. A gelled nonpigmented wood stain composition comprising:
(a) from 0.3 to 10% by weight of at least one soluble aniline dye;
(b) from 0.5 to 6% of dibenzylidene sorbitol; and
(c) the remainder of the composition being selected from benzyl alcohol, and benzyl alcohol, with a solvent in an amount less than about 20% by weight of the benzyl alcohol and selected from ethyl alcohol and Cellosolve.

4,187,073

SURFACTANT FLOODING OIL RECOVERY PROCESS

Vernon H. Schievelbein, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Dec. 9, 1977, Ser. No. 858,926
Int. Cl.[2] E21B *43/22*
U.S. Cl. 252—8.55 D 5 Claims

1. In a method of recovering petroleum from a subterranean permeable, petroleum-containing formation, said formation containing water having a salinity of at least 20,000 parts per million total dissolved solids, said formation being penetrated by at least one injection well and by at least one production well, both wells being in fluid communication with the formation, comprising injecting an aqueous, surfactant-containing fluid into the formation via the injection well to displace petroleum toward the production well, from which it is recovered to the surface of the earth, said surfactant fluid containing an alkylpolyalkoxyalkylene sulfonate or alkylarylpolyalkoxyalkylene sulfonate surfactant having the following formula:

$$RO(R'O)_nR''SO_3^-M^+$$

wherein R is an alkyl group having from 9 to 25 carbon atoms, or an alkylaryl group, containing at least one alkyl substituent containing from 9 to 15 carbon atoms, R′ is ethylene or a mixture of ethylene and higher molecular weight alkylene with relatively more ethylene than higher molecular weight alkylene, R″ is ethylene, propylene, hydroxy propylene or butylene, n is a number from 2 to 10 and M^+ is sodium, potassium, lithium or ammonium, wherein said improvement for increasing said phase stability and injectability of a surfactant fluid, and improving its low surface tension oil displacement effectiveness, which comprises:
shearing the surfactant fluid at the surface at a shear rate of at least 150 reciprocal seconds for a period of time of at least 0.1 minutes and sufficient to render the surfactant fluid less turbid prior to injecting it into the formation via the injection well.

4,187,074

WATER-SOLUBLE CATIONIC OLIGOURETHANE RESINS AND THE USE THEREOF FOR THE TREATMENT OF PELTS OR LEATHER

Harro Träubel; Dieter Dieterich, both of Leverkusen, and Helga Heinze, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Aug. 18, 1978, Ser. No. 934,775
Claims priority, application Fed. Rep. of Germany, Sep. 1, 1977, 2739378
Int. Cl.[2] C03G *18/30*
U.S. Cl. 8—94.19 10 Claims

1. Water-soluble oligourethanes which contain methylol groups and are free from isocyanate groups and have a molecular weight, between about 600 and 5,000, produced by a process comprising reacting
(a) polyethylene glycol ethers having a molecular weight between about 400 and 1,500,
(b) polyisocyanates,
(c) optionally compounds having a molecular weight below about 300 which are mono-functional or poly-functional in the reaction thereof with isocyanates and
(d) formaldehyde, characterized in that components (a) and/or (c) together contain a total of from about 20 to 200 milliequivalents of tertiary nitrogen atoms per 100 g of oligourethane solids content, from about 20 to 95% of which nitrogen atoms have been converted into quaternary ammonium nitrogen or into ammonium salt form by treatment with alkylating agents and/or acids and the resultant oligourethane contains from about 40 to 90% by weight of component (a).

4,187,075

METHOD OF ANALYZING BIOLOGICAL, LIQUID SPECIMENS FOR ANTIGENS OR ANTIBODIES

Hans G. Noller, 1512 Basswood Cir., Glenview, Ill. 60025

Continuation-in-part of Ser. No. 689,335, May 24, 1976. This application Feb. 16, 1977, Ser. No. 769,044
Claims priority, application Fed. Rep. of Germany, May 26, 1975, 2523209; Feb. 21, 1976, 2607149
Int. Cl.[2] G01N *33/16, 21/38, 31/14*
U.S. Cl. 23—230 B 11 Claims

1. A method of analyzing a volatile liquid for the presence therein of one member of the group consisting of an antigen and an antibody capable of specifically combining with said antigen, said one member being dispersed in said liquid, and the other member of said group carrying a labeling agent which method comprises:
(a) depositing a specimen of said liquid on an inert solid substrate;
(b) volatilizing said liquid under conditions leaving said one member as a deposit on the surface of said substrate;
(c) holding said deposit in contact with a fixing agent for a period sufficient to fix said one member to said substrate;
(d) contacting said surface with said other member for a period sufficient for combining said members if said one member is present;
(e) removing from said surface any amount of said other member not combined with said one member; and
(f) generating a sensible signal indicative of the presence of said labeling agent on said substrate after said removing.

4,187,076

PARAQUAT DETECTION METHOD

Mahmoud A. Elsohly, and Carlton E. Turner, both of Oxford, Mich., assignors to The University of Mississippi, University, Mich.

Filed Jul. 25, 1978, Ser. No. 927,852
Int. Cl.[2] G01N *31/12, 31/08, 31/22, 33/16*
U.S. Cl. 23—230 PC 31 Claims

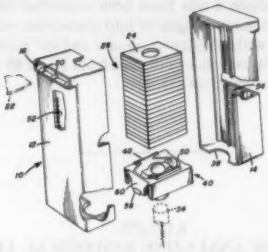
1. The process for detecting the presence of paraquat in a material comprising the steps of converting any paraquat present in the material to a pyrolysis stable salt of 4,4′-bipyridine, converting any said 4,4′-bipyridine salt present to 4,4′-bipyridine and analyzing said sample for the presence of 4,4′-bipyridine, the presence of which indicates the presence of paraquat in the material.

4,187,077

CONTAINER WITH ARTICLE POSITIONING ELEMENT FOR DISPENSING REAGENT COATED SLIDES TO AN AUTOMATED ANALYZER

Roger G. Covington; Stephen H. Miller, both of Rochester, and Archie J. Tucker, Middlesex, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 5, 1978, Ser. No. 912,665
Int. Cl.[2] G01N *1/28*
U.S. Cl. 422—63 5 Claims



1. An article container for dispensing reagent articles to apparatus having an extendable plunger and being adapted to use the articles to carry out quantitative chemical analysis of fluid samples; said container comprising:

wall structure forming a chamber having a dispensing station, said chamber being adapted to receive a stack of articles for movement toward, and sequential removal from, said dispensing station for delivery to the apparatus, said wall structure having an opening through which the plunger may extend into said chamber; and

a stack positioning element separate from the plunger and captured in said chamber between a received article stack and said opening, said element being engageable and movable by the plunger extending through said opening, toward said dispensing station to urge a received article stack toward said dispensing station, whereby the articles are sequentially indexed into said dispensing station as preceding articles in the stack are removed from said container.

4,187,078

COAL DISPERSING OIL

Hirozumi Shimizu; Taizo Igarashi; Takaharu Ishizaki; Toshio Koma, and Hideki Takahashi, all of Amagasaki, Japan, assignors to Nippon Oil and Fats Company, Limited, Tokyo, Japan

Filed Oct. 6, 1977, Ser. No. 840,096
Claims priority, application Japan, Oct. 13, 1976, 51/121906; Oct. 22, 1976, 51/126306
Int. Cl.[2] C10L *1/32*
U.S. Cl. 44—51 10 Claims

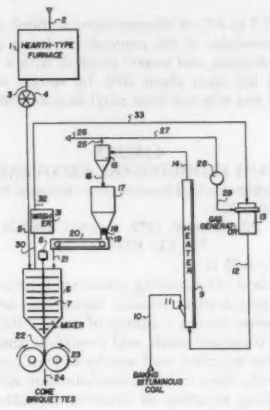
1. Coal dispersing oil compositions containing 30–60% by weight of a petroleum oil, 40–70% by weight of coal powders and 0.01–5% by weight of at least one surface active agent selected from the group of compounds consisting of alkyl esters of sulfosuccinic acids, alkenyl esters of sulfosuccinic acids, α-sulfonated fatty acids, α-sulfonated fatty acid alkyl esters, and metal and amine salts of these compounds.

4,187,079

METHOD FOR PRODUCING FORM COKE

Heinrich Weber, Recklinghausen; Kurt Lorenz, Hattingen; Horst Dungs, Herne, and Karl-Heinz Wollenhaupt, Gelsenkirchen, all of Fed. Rep. of Germany, assignors to Firma Carl Still, Fed. Rep. of Germany

Filed Sep. 11, 1978, Ser. No. 941,016
Claims priority, application Fed. Rep. of Germany, Sep. 13, 1977, 2741075
Int. Cl.[2] C10L *5/00*; C10B *53/04*
U.S. Cl. 44—10 C 9 Claims



1. A method for the production of form coke comprising: subjecting a highly volatile coal containing at least 35% volatile constituents to a coking in order to remove a substantial amount of the volatile constituents to form a non-baking base coal; mixing a plurality of fine grain coal components together, of which at least one is said non-baking base coal and at least one other comprises a baking bituminous coal in order to form a coal mixture; subjecting the coal mixture to a degassing operation; coking the degassed mixture to form a coke; and pressing the resulting coke to form briquettes.

4,187,080

TREATING CONDENSATE FROM GASIFICATION OF COAL

Carl Hafke, Frankfurt am Main; Roland Weber, Bruchköbel, and Rudolf Kohlen, Wehrheim, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 704,253, Jul. 12, 1976, abandoned. This application Oct. 7, 1977, Ser. No. 840,433
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1976, 2607745
Int. Cl.[2] C10J *3/16*
U.S. Cl. 48—202 4 Claims

1. The process for the production of gas from coal which comprises the steps of:

(a) effecting gasification by contacting a packed bed of coal with oxygen and water vapor at a pressure in the range of about 5–150 bars to form a raw gas containing tar, solids and water at a temperature of about 400°–700° C.;

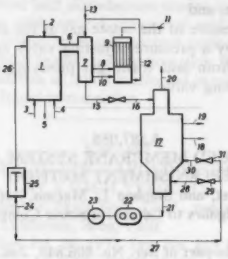
(b) cooling said raw gas to effect condensation of the tar and water by contacting it with a cooling liquid containing water at a temperature of about 160°–220° C., the condensate containing the solids;

(c) separating from the solids-containing condensate a heavy fraction enriched in high-boiling tar with a solids content of about 10–60%;

(d) passing said heavy fraction to a solids disintegrator

wherein substantially all of the solids are reduced in size to a particle size substantially below about 2 mm;

(e) then recycling at least part of said heavy fraction from step (d) to the gasification step (a); and



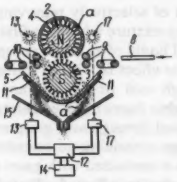
(f) finally recycling the balance of said heavy fraction to the separation step of step (c).

4,187,081

APPARATUS FOR TREATMENT OF SHEET MATERIAL WITH THE USE OF FERROMAGNETIC POWDER

Boris N. Shikhirev; Evgeny A. Matrosov, and Ilya A. Deresh, all of Moscow, U.S.S.R.

Filed Feb. 9, 1978, Ser. No. 876,641
Int. Cl.[2] B24B *21/00*
U.S. Cl. 51—23 **4 Claims**



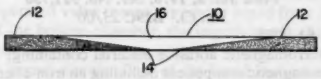
1. In an apparatus for treating sheet material with ferromagnetic powder in a magnetic field, comprising a magnetic system for retaining abrasive ferromagnetic powder in a treating zone formed by two vertically stacked rolls made of ferromagnetic material having a gap therebetween for the passage of the sheet material being treated and rotatable in opposite directions at substantially equal speeds, and a means for exciting a magnetic field with a magnetic circuit positioned at least at one end of the rolls so that the lines of force pass along the axes of said rolls and cross the gap therebetween, said rolls serving as opposite poles of said magnetic system whereby the particles of ferromagnetic powder are retained in the gap between the rolls through which passes the material being treated, and a means for feeding and withdrawing sheet material, the improvement which comprises arranging underneath the bottom roll a net with the mesh size thereof being slightly smaller than the minimum permissible size of the powder grains, said net being disposed within the zone of the magnetic field excited by said magnetic field exciting means which induces the force required to retain the powder on the surface of said rolls whereby the grains of said ferromagnetic powder are lifted from the net and placed onto the surface of the bottom roll.

4,187,082

DENTAL FINISHING STRIPS

Humberto R. Guerra, 4800 Marque Dr., New Orleans, La. 70120

Filed Jun. 17, 1974, Ser. No. 479,729
Int. Cl.[2] A61C *3/06, 3/12*
U.S. Cl. 51—295 **3 Claims**



1. A dental finishing strip for smoothing and finishing dental work to the level of external tooth structure comprising:

a. an elongated flexible plastic strip, having oppositely disposed ends, a thickness to fit between adjacent teeth, a width to extend between a gum line and a contact point between adjacent teeth, and a length between said oppositely disposed ends for manual holding and pulling back and forth by said ends between adjacent teeth; and

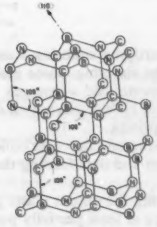
b. abrasive grit coating means in two different grades fixed on a side of said flexible plastic strip and respectively extending in a different grade longitudinally and diagonally from each of said oppositely disposed ends toward the center thereof to define tapering and longitudinally opposed grit coated areas, tapering and transversely opposed grit coated and uncoated areas, and an uncoated center area therebetween, for inserting said flexible plastic strip between adjacent teeth and manually pulling said strip in a back and forth motion between said center and an end in sequence, the grit covered areas in sequence removing surplus and smoothing the rest of said dental work without ridging.

4,187,083

HARD MATERIALS OF BCN IN TETRAHEDRAL FORM AND METHOD OF MAKING IT

Roger J. Wedlake, 289 Lister Rd., Rembrandt Park, Johannesburg, Transvaal, and Anthony L. Penny, 16 High Rise, Primrose Ter., Berea, Johannesburg, Transvaal, both of South Africa

Filed Feb. 16, 1978, Ser. No. 878,472
Claims priority, application South Africa, Feb. 16, 1977, 77/0925
Int. Cl.[2] C01B *35/14;* C04B *31/16*
U.S. Cl. 51—307 **12 Claims**



1. A hard material consisting essentially of $B_xC_yN_z$, wherein x, y and z can have any value greater than or equal to 1, in tetrahedral form.

4,187,084
FERROMAGNETIC ABRASIVE MATERIAL AND METHOD FOR PREPARING THE SAME

Nikolai S. Khomich, ulitska Karbysheva, 11, kv. 10; Faddei J. Sakulevich, pereulok Dalny, 3, both of Minsk; Boris N. Putimtsev, shosse Entuziastov, 111, kv. 71, Moscow, and Vladimir A. Silaev, stantsia Redkino, prospekt Khimikov, 36, kv. 14, Kalininskaya oblast, all of U.S.S.R.

Filed Jul. 3, 1978, Ser. No. 921,730
Int. Cl.[2] B29C *23/00*
U.S. Cl. 51—308 **7 Claims**

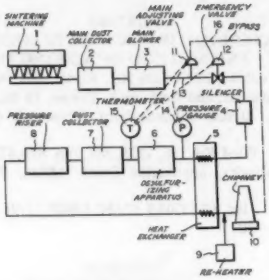
1. A ferromagnetic abrasive material containing:
a ferromagnetic component including an iron-aluminum-silicon-phosphorus-carbon alloy; and
an abrasive component including aluminum and silicon oxides, carbides, nitrides and phosphides;
said ingredients being used in the following proportions (in % by weight):

iron	75–97
aluminum	0.2–16.0
silicon	0.2–18.0
phosphorus	0.005– 1.5
carbon	0.005– 4.0
oxygen	0.05 – 3.0
nitrogen	0.01– 0.5
including: aluminum and silicon oxides, carbides, nitrides and phosphides	0.01– 5.0

4,187,085
TREATING FACILITY FOR SINTERING WASTE GAS

Teiji Shibuya, Yokohama; Yasuaki Ishikawa, Kawasaki; Masayuki Saito, and Kiyoharu Ueda, both of Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 3, 1978, Ser. No. 883,202
Claims priority, application Japan, Mar. 29, 1977, 52/33969
Int. Cl.[2] B03C *3/36;* **B01D** *50/00*
U.S. Cl. 55—4 **21 Claims**

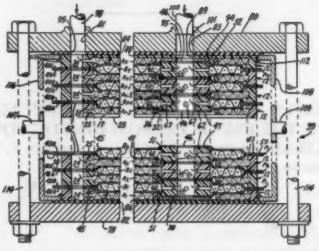


14. A method for purifying sintering waste gas comprising removing dust from the sintering waste gas in a first electric dust collector, and moving said waste gas through said first dust collector by a main blower having an exhaust,
the improvement comprising:
feeding the waste gas from said first dust collector to a metallic rotary heat exchanger and then feeding the waste gas out of the heat exchanger;
at least partially purifying the output waste gas from said heat exchanger to produce at least partially purified waste gas;
removing dust from said at least partially purified waste gas in a second wet electric dust collector to produce purified waste gas;
raising the pressure of said purified waste gas;
feeding the purified waste gas which had its pressure raised in said pressure raising step to said heat exchanger to effect a heat exchange with said waste gas received by said heat exchanger from said first dust collector;
exhausting the heat exchanged purified waste gas from said heat exchanger;
said steps of heat exchanging, purifying, second dust collecting, pressure raising and exhausting comprising a waste gas purifying stage; and
adjusting the pressure of the waste gas at the exhaust of said main blower by a pressure adjusting valve and selectively releasing gas from said waste gas purifying stage via said pressure adjusting valve.

4,187,086
PACKAGED MEMBRANE SYSTEM AND REPLENISHMENT METHOD

Gunnar E. Walmet, and Stephen L. Matson, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 806,845, Jun. 13, 1977, abandoned. This application Nov. 1, 1978, Ser. No. 956,781
Int. Cl.[2] B01D *13/00, 59/12*
U.S. Cl. 55—16 **22 Claims**



10. In a method of selectively removing a gaseous component from a gaseous mixture wherein a first membrane containing an immobilized liquid of an initial composition is contacted with said mixture to effect facilitated transport of said gaseous component through said first membrane to a hydrophobic porous gas-permeable barrier; gases emerging from said first membrane are passed through said gas-permeable barrier; and a second membrane containing an immobilized liquid of said initial composition is contacted with gases emerging from said gas-permeable barrier to effect facilitated transport of said gaseous component through said second membrane, the improvement for substantially maintaining the separation efficiency of said first and second membranes, which comprises the steps of (a) introducing fresh liquid into first regions of each of said first and second membranes to effect emission of at least partially deactivated liquid from second regions of each of said first and second membranes, and (b) substantially concurrently with said introduction step removing said deactivated liquid from said second regions such that substantially no accumulation of liquid is effected in said membranes by said introduction step, said fresh liquid being of said initial composition.

13. In a packaged membrane system having
(a) a plurality of at least partially spaced immobilized liquid membranes disposed in generally parallel surface-to-surface array to define both a first group of flow volumes and a second group of flow volumes alternating between said first flow volume group,
(b) means for spacing apart adjacent membranes disposed in each of the flow volumes of at least one of said first and second flow volume groups,
(c) means for defining the periphery of each of said flow volumes,
(d) means for providing separate access to and egress from

the plurality of flow volumes in said first group and in said second group,

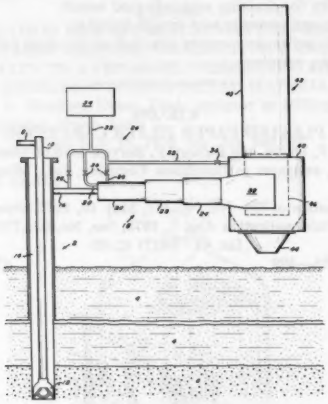
the improvement comprising, in combination with the above, (i) means for introducing fresh membrane liquid into first regions of said membranes and (ii) outlet means separate from said introduction means and in flow communication with second regions of said membranes for removing liquid from said second regions concurrently with the fresh liquid introduction such that substantially no accumulation of liquid is effected in said membrane by said fresh liquid introduction.

4,187,087

HANDLING FLUID DISCHARGED FROM A CONDUIT AT A HIGH VELOCITY

Olin D. Whitescarver, Santa Rosa, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Jul. 26, 1977, Ser. No. 819,177
Int. Cl.² B01D *19/00*
U.S. Cl. 55—43 **22 Claims**



1. An apparatus for transferring a fluid comprising a mixture of gas, liquid and particulated solids from a high pressure source to a low pressure environment at a high flow velocity comprising:

(a) a transfer conduit attached to the high pressure source for withdrawing the fluid therefrom,

(b) an expansion conduit comprising a series of axially-aligned and longitudinally-disposed connected conduit sections of increasing cross-section area, the section having the smallest cross-sectional area being connected to the transfer conduit,

(c) a vertical separator connected in sliding engagement to the section of the expansion conduit having the largest cross-sectional area, and

(d) means for injecting a treating material into the fluid flowing through said apparatus.

4,187,088

DOWN FLOW CENTRIFUGAL SEPARATOR

Robert A. Hodgson, Tulsa, Okla., assignor to Maloney-Crawford Corporation, Tulsa, Okla.

Filed Jan. 18, 1979, Ser. No. 4,485
Int. Cl.² B01D *41/12*
U.S. Cl. 55—169 **5 Claims**

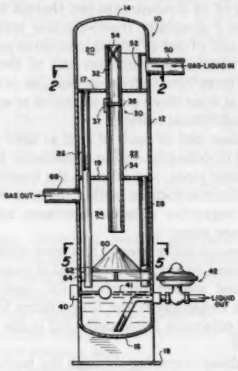
1. A centrifugal separator for separating liquid from gas having

a vertically oriented cylindrical shell with a top and bottom, the shell divided by transverse walls into three chambers, a top chamber, a central chamber, and a bottom chamber,

a first downcomer pipe for separated liquids from the top chamber to the bottom chamber, a second downcomer pipe for separated liquid from the central chamber to the bottom chamber,

an axial tube extending from the top chamber to the bottom chamber, the axial tube formed of two parts, upper and lower, spaced slightly apart to form a gap which is positioned in the upper part of the central chamber, liquid level operated valve means to remove liquid from a lower part of the bottom chamber, the improvement characterized by,

means to impart circular flow of the liquid and gas mixture



into the top chamber to create a vortex within the axial tube, means whereby liquid is first separated to the outside of the top chamber draining into the bottom chamber via the first downcomer pipe, and whereby liquid entrained in the axial tube is substantially removed via the gap, and liquid in the central chamber draining via the second downcomer pipe into the bottom chamber,

a cone-shaped baffle supported in the bottom chamber, the apex of which is axially below the lower end of the axial tube, the bottom of the cone being of less diameter than the diameter of the bottom chamber, and

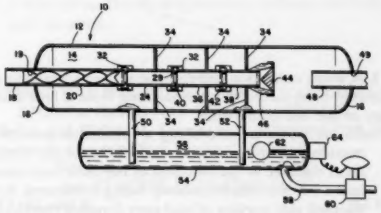
a gas outlet in an upper part of the bottom chamber.

4,187,089

HORIZONTAL VAPOR-LIQUID SEPARATOR

Robert A. Hodgson, Tulsa, Okla., assignor to Maloney-Crawford Tank Corporation, Tulsa, Okla.

Continuation of Ser. No. 761,963, Jan. 24, 1977, abandoned. This application Jun. 26, 1978, Ser. No. 919,121
Int. Cl.² B01D *45/12*
U.S. Cl. 55—219 **4 Claims**



1. A horizontal vapor-liquid separator, which comprises:

a housing providing a separation chamber;

a substantially horizontally disposed cylindrical inlet tubing extending through the housing wall to said separation

chamber and having the inner periphery of the downstream end of said tubing beveled at a given angle outwardly in a generally frusto-conical shape;

means located within said inlet tubing for imparting a helical motion to the vapor-liquid mixture introduced into said tubing;

at least three cylindrical pipes, coaxially aligned with the inlet tubing, and of the same inside and outside diameter as said inlet tubing along the entire length of said at least three pipes, each of said at least three pipes having its outer periphery upstream end beveled inwardly to form a generally frusto-conical outer facing, and the inner periphery of its downstream end thereof beveled outwardly to form a generally frusto-conical inner facing, the upstream end of one of said at least three pipes being inserted in the beveled downstream end of the inlet tubing and spaced therefrom to form an annular orifice and the other of said at least three pipes mounted in spaced sequence to define additional orifices;

the upstream end of each of said at least three pipes being swaged to define an orifice of diameter less then the diameter of said pipes, and wherein the leading edge of each of said orifices is located within the said downstream bevel of the respective adjacent upstream inlet tubing and at least three pipes;

a solid conical baffle means mounted with its apex toward the beveled end of the last of said at least three cylindrical pipes, and spaced therefrom for coalescing any liquid droplets remaining in the flow exiting from said pipe;

means for removing liquid collected in the separation chamber; and

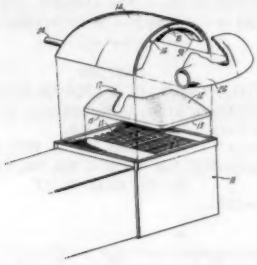
exhaust tubing extending through the housing wall into said separation chamber in substantial axial alignment with the inlet tubing.

4,187,090

HEAT EXCHANGER WATER COLLECTION SYSTEM

Peter Bizzarro, Bloomfield, and John L. Warner, Simsbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 29, 1978, Ser. No. 947,142
Int. Cl.[2] B01D *51/00*
U.S. Cl. 55—269 **10 Claims**



1. A water collection and disposal system adapted to remove moisture from an airstream emanating from a heat exchanger core or the like comprising:

baffle means connected along a substantial portion of the outside edge of said core, said baffle means extending a short distance in the direction of the outlet airstream from said core and simultaneously being contoured toward a selected side portion of said core forming thereby a gradual area restriction to the entire outlet airstream from said core for increasing the velocity thereof;

a substantially semi-hemispherical header member having one open end with the remainder of said header completely covering said core and said baffle means, said header member being contoured in the area above which said airstream passes through the area restriction in said baffle means, said contour in said header member being such as to cause the airstream to be redirected within said header member away from the area of said header member where said airstream initially impinges, the increasing velocity and changing direction of said airstream centrifuging heavy droplets of water and causing the accumulated water to flow along the inner surface of said header member in the direction of airstream flow;

water collector means attached about the inside contour of said header member at the open end thereof, said water collector means extending a short distance below the inside of said header member and including a solid wall portion for blocking the airstream flow and also including a trough member connected to said solid wall portion for collecting the water in said airflow, said trough member being extended along the length of said header member and forming a drain cavity between said extended portion of said trough member and one side of said header member for accumulating the collected water;

a drain tube connected to said header adjacent said drain cavity for draining said collected water;

air passage means in said trough member;

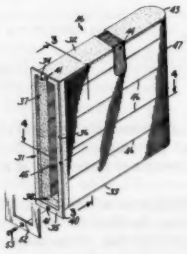
and air outlet duct means attached to the open end of said header member.

4,187,091

PLEATED PAPER FILTER CARTRIDGE

Reynold F. Durre, and Richard P. Berven, both of Minneapolis, Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.

Continuation of Ser. No. 797,317, May 16, 1977, abandoned.
This application Aug. 7, 1978, Ser. No. 931,770
Int. Cl.[2] B01D *46/00*
U.S. Cl. 55—499 **17 Claims**



9. A replacement filter for use in a filter housing having an elongated rectangular opening through which the filter is inserted, comprising:

a supporting frame of generally rectangular configuration dimensioned to overlie the rectangular housing opening and defining front and back faces, the frame comprising a first pair of elongated sides spaced apart to define an elongated opening therebetween, and a second pair of shorter sides connecting the ends of the first pair;

a filter body of pleated filter material, the body being flexible about the pleats and formed into a substantially U-shaped configuration that defines first and second adjacent ends and first and second substantially U-shaped edges, the filter body having a dimension extending in the direction of the pleats that approximates the length of the elongated frame opening and a predetermined insertion dimension;

means for sealably securing the first and second filter body ends to the first and second frame sides, respectively, so that the U-shaped filter body projects rearwardly from the back face of the supporting frame over said insertion dimension;

and a resiliently flexible closure member sealably secured to

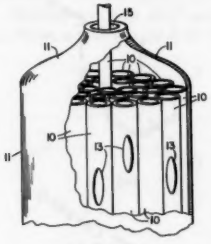
each of said second pair of shorter sides and to the associated U-shaped filter body edge, so that air entering the frame opening must pass through the filter body and vice versa, the filter body and closure members in their assembled state being together flexible between a first configuration in which the filter body is substantially straight over its insertion dimension and a second configuration in which the filter body is substantially curved over the insertion dimension with said pleats always remaining substantially mutually parallel, whereby the filter may be inserted through the rectangular housing opening where the available space in front of the housing is less than the insertion dimension of the filter body.

4,187,092

METHOD AND APPARATUS FOR PROVIDING INCREASED THERMAL CONDUCTIVITY AND HEAT CAPACITY TO A PRESSURE VESSEL CONTAINING A HYDRIDE-FORMING METAL MATERIAL

Ronald L. Woolley, Orem, Utah, assignor to Billings Energy Corporation, Provo, Utah

Filed May 15, 1978, Ser. No. 906,089
Int. Cl.[2] F17C *11/00*
U.S. Cl. 62—48 **7 Claims**



1. A hydrogen storage system comprising:

an elongate pressure vessel having an opening therein for charging hydrogen to the vessel and for withdrawing hydrogen from the vessel;

valve means in combination with the opening in said vessel for controlling the flow of hydrogen gas to and from said vessel;

a plurality of elongate tubes being made of a metal selected from the group consisting of aluminum, magnesium, and copper, and being positioned within said pressure vessel with the longitudinal axes of said tubes being parallel to the longitudinal axis of said vessel, each of said tubes being in firm contact along its longitudinal surface with the longitudinal surfaces of at least three other tubes to form a coherent, tightly packed tube bundle in which the outer tubes thereof also make firm contact along their longitudinal surfaces with the longitudinal inside surface of said vessel; and

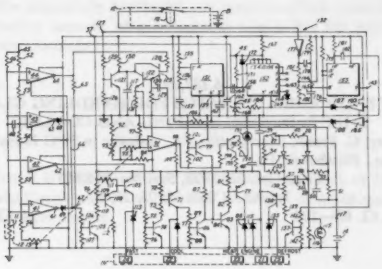
particulate, hydride-forming, metal material substantially filling the otherwise void spaces within said vessel, said metal material being capable of reacting with and absorbing hydrogen gas at a given temperature and pressure and thereafter releasing the hydrogen gas when the pressure on the hydrogen-containing material is reduced and/or the temperature of the hydrogen-containing material is increased.

4,187,093

REFRIGERATOR ELECTRONIC TEMPERATURE CONTROL AND MALFUNCTION SIGNAL APPARATUS

James P. Boratgis, Lee Hill Rd., and Earle S. Pittman, 2269 Mariposa, both of Boulder, Colo. 80302

Filed Feb. 1, 1978, Ser. No. 874,258
Int. Cl.[2] F25B *49/00*
U.S. Cl. 62—126 **17 Claims**



1. In refrigerator electronic control apparatus for controlling the temperature in and providing a malfunction signal for a refrigeration unit associated with a refrigerated chamber, the combination comprising:

temperature sensor means for said chamber;

temperature selector means for said chamber having a range of temperature settings; and

electronic circuit means including:

temperature reference means operatively associated with said temperature selector, said temperature reference means establishing a plurality of temperature reference points at selected temperature increments above and below a set point,

a comparator associated with each of said temperature reference points, each comparator responsive to an output of the associated set point and to an output of said temperature sensor means, and

control means including a plurality of solid state control elements, each control element responsive to an output of one of said comparators for alternately effecting the actuation of a heat load device in said refrigeration unit when the temperature in said chamber is a selected temperature increment below said set point and effecting the actuation of a cool load device in said refrigeration unit when the temperature in said chamber is a selected temperature increment above said set point to automatically maintain the temperature in said chamber within a selected temperature range and for also effecting the actuation of a malfunction indicator and disabling a prime mover load device to stop said refrigeration unit in the event of a malfunction in said refrigeration unit when the temperature in said chamber exceeds a selected maximum temperature reference point above said set point.

4,187,094

METHOD FOR IMPROVING THE DURABILITY OF SPONTANEOUS NAF OPAL GLASSWARE

Kun-Er Lu, and Walter H. Tarcza, both of Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed May 8, 1978, Ser. No. 903,537
Int. Cl.[2] C03C *15/00*; C04B *35/00*
U.S. Cl. 65—30 R **5 Claims**

1. A method for improving the durability of a spontaneous sodium fluoride opal glass article against surface attack by water which comprises the steps of:

(a) contacting the glass article with a Na_2O-extracting medium comprising water at a temperature in the range of about 50°–100° C. for a time sufficient to deplete the Na_2O

content of the surface layer but insufficient to remove all of the extractable Na_2O therefrom; and thereafter

(b) heating the glass article to a temperature in the range of about 200°-500° C. for a time sufficient to consolidate the Na_2O-depleted surface layer but insufficient to permit the migration of additional Na_2O from the interior of the glass article to the surface thereof, thus to provide a surface free from microcracking and with good surface gloss.

4,187,095

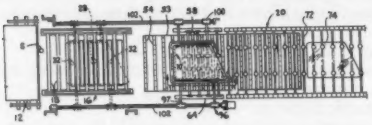
METHOD AND APPARATUS FOR HANDLING GLASS SHEETS DURING SHAPING AND COOLING

Robert G. Frank, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 25, 1978, Ser. No. 954,697

Int. Cl.[2] C03B *23/02, 27/00*

U.S. Cl. 65—104 **8 Claims**



1. In the art of handling glass sheets during thermal processing wherein a glass sheet is supported by suction against the under surface of a vacuum mold and is deposited by release of vacuum onto a ring-like member for transfer into a cooling station downstream of said vacuum mold along a path of travel, said ring-like member having a pair of upstream end stop means attached thereto on the upstream side of said path of travel,

the improvement comprising moving said ring-like member to a position where said upstream end stop means are located slightly upstream of the trailing edge of said glass sheet when said glass sheet is supported by suction against said vacuum mold,

releasing said vacuum to deposit said glass sheet onto said ring-like member with the trailing edge of said glass sheet spaced slightly downstream of said upstream end stop means, and

suddenly moving said ring-like member in a downstream direction rapidly enough to slide said glass sheet relative to said ring-like member until the trailing edge of said glass sheet is engaged by said upstream end stop means to orient and align said glass sheet in proper orientation and alignment relative to said ring-like member and to maintain said orientation and alignment while said ring-like member moves into and within said cooling station.

6. In the art of handling glass sheets during thermal processing wherein a glass sheet is supported on a ring-like member having an opening in the downstream portion thereof for transport along a path of travel in a downstream direction between a shaping station and a cooling station, is lifted at said cooling station from said ring-like member onto rolls rotating in a downstream direction to propel said glass sheet onto a downstream conveyor,

the improvement comprising starting to return said ring-like member in an upstream direction toward said shaping station before the trailing edge of said glass sheet has cleared beyond the downstream end of said ring-like member as a consequence of a downstream motion imparted to said glass sheet by said rotating rolls, thereby reducing the time needed for the ring-like member to complete a cycle of movement along said path of travel between said shaping station and said cooling station.

4,187,096

BIOCIDALLY-ACTIVE 1,3-BENZODITHIOLE-2-THIONE COMPOUNDS

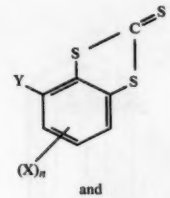
Khalid Rasheed, Weslaco, and James D. Warkentin, McAllen, both of Tex., assignors to The Ansul Company, Marinette, Wis.

Continuation-in-part of Ser. No. 618,255, Sep. 30, 1975, Pat. No. 4,139,362. This application Aug. 4, 1977, Ser. No. 821,977

Int. Cl.[2] A01N *9/12;* **A61K** *31/385;* **C07C** *339/06*

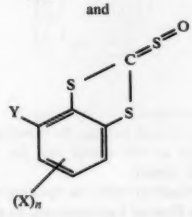
U.S. Cl. 71—90 **40 Claims**

1. A compound selected from the group consisting of those of the formulae:



I

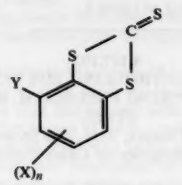
and



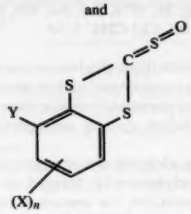
II

wherein Y is selected from nitro and trifluoromethyl; X is selected from alkyl and alkenyl of up to 6 carbon atoms, nitro, trichloromethyl, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, trifluoromethylsulfoxy, trifluoromethylsulfonyl, methoxymethyl, cyano, carboxy, halogen (F, Cl, Br, I), hydroxy, acetylamino, amino, N-phenylamino, N,N-diallylamino, alkoxy, dimethylaminodithiocarbamyl, carboalkoxy, alkylthio, mono- and dialkylamino, N-alkylcarbamyl, N,N-dialkylcarbamyl, alkylsulfoxy, alkylsulfonyl, said alkyl groups containing from 1 to 4 carbon atoms; n is an integer from 0 to 3; and salts thereof.

27. A method of treating pests associated with growing plants selected from fungi, insects and mites to beneficially enhance the growth and/or yield-potential of said growing plants which comprises treating soil, seed or said plants with a biocidally active amount of a compound selected from the group consisting of those of the formulae:



and



wherein Y is selected from hydrogen, cyano, alkylsulfonyl, nitro and trifluoromethyl; X is selected from alkyl and alkenyl of up to 6 carbon atoms, nitro, trichloromethyl, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, trifluoromethylsulfoxyl, trifluoromethylsulfonyl, methoxymethyl, cyano, carboxy, carbamyl, halogen (F, Cl, Br, I), hydroxy, acetylamino, amino, N-phenylamino, N,N-diallylamino, alkoxy, dimethylaminodithiocarbamyl, carboalkoxy, alkylthio, mono- and dialkylamino, N-alkylcarbamyl, N,N-dialkylcarbamyl, alkylsulfoxy, alkylsulfonyl, said alkyl groups containing from 1 to 4 carbon atoms; n is an integer from 0 to 3; and salts thereof.

4,187,097

N-HYDRAZIDES OF 2-BENZOTHIAZOLINONE AS PLANT GROWTH REGULANTS

John J. D'Amico, Olivette, Mo., assignor to Monsanto Company, St. Louis, Mo.

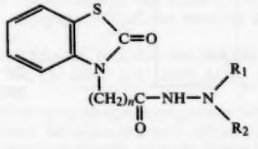
Filed Dec. 16, 1977, Ser. No. 861,479

The portion of the term of this patent subsequent to Feb. 21, 1995, has been disclaimed.

Int. Cl.[2] A01N *9/12*; C07D *417/12*

U.S. Cl. 71—90 **21 Claims**

8. A method of regulating the growth of leguminous plants which comprises applying to the plant locus a plant growth regulating effective amount of a compound having the formula



wherein R_1 is hydroxy lower alkyl or 2-benzothiazolyl; R_2 is hydrogen; or R_1 and R_2 when taken together with the adjacent nitrogen form a saturated ring of 3 to 7 members and n is an integer from one to four.

4,187,098

SELECTIVELY HERBICIDAL N-(5-SUBSTITUTED-2-THIADIAZOLYL)-THIOCARBOXAMIDES

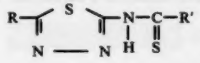
Natu R. Patel, Overland Park, Kans., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Nov. 24, 1978, Ser. No. 963,553

Int. Cl.[2] A01N *9/12*

U.S. Cl. 71—90 **8 Claims**

1. The selectively herbicidal composition which comprises an effective amount of a compound which has the general structural formula



in which R is trifluoromethyl, N,N-dimethylsulfamyl, or N,N-diethylsulfamyl and R′ is ethyl or isopropyl in combination with an inert carrier.

4,187,099

3-ARYL-4-ISOTHIAZOLECARBOXYLIC ACID AND 3-ARYL-4-ISOXAZOLECARBOXYLIC ACID DERIVATIVES AND THEIR USE AS HERBICIDES

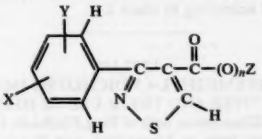
John E. Franz, Crestwood, and Robert K. Howe, Bridgeton, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 16, 1977, Ser. No. 852,164

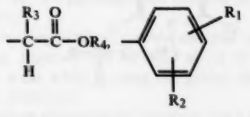
Int. Cl.[2] A01N *9/12*

U.S. Cl. 71—90 **7 Claims**

1. A method of inhibiting the growth of undesirable plants which comprises applying to the plant system a herbicidally effective amount of a compound having the formula



wherein X and Y are independently selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, trifluoromethyl, halogen, cyano and nitro; n is zero or one provided that when n is zero, Z is selected from the group consisting of chloro and NR_1R_2 wherein R_1 and R_2 are independently selected from the group consisting of hydrogen and lower alkyl; when n is one, Z is selected from the group consisting of alkyl having up to 12 carbon atoms inclusive, alkyl having up to 5 carbon atoms inclusive which have been substituted with from 1 to 3 halogen atoms, inclusive, benzyl, lower alkoxy lower alkyl, allyl, monochlorinated allyl, dichlorinated allyl,



and agriculturally acceptable cations; wherein R_1 and R_2 are as previously defined, R_3 is hydrogen or methyl and R_4 is lower alkyl.

4,187,100

4,5-DICHLORO-IMIDAZOLE-1-CARBOXYLIC ACID ARYL ESTERS AND THEIR USE AS HERBICIDES

Klaus Sasse, Berg.Gladbach; Gunther Beck; Ludwig Eue, both of Leverkusen, and Robert R. Schmidt, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

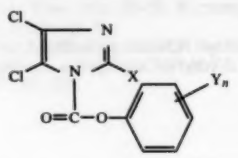
Division of Ser. No. 835,092, Sep. 21, 1977. This application Oct. 2, 1978, Ser. No. 948,185

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1976, 2646143

Int. Cl.[2] C07D *233/90*; A01N *9/22*

U.S. Cl. 71—92 **11 Claims**

1. A 4,5-dichloro-imidazole-1-carboxylic acid aryl ester of the formula



(I)

in which

X represents trifluoromethyl or cyano,

Y represents halogen, alkyl with 1 to 6 carbon atoms, trifluoromethyl, alkoxy with 1 to 6 carbon atoms, alkylmercapto with 1 to 6 carbon atoms, nitro, cyano or a

group,

in which

R^4 represents alkyl with 1 to 6 carbon atoms, and n represents 0, 1, 2, 3, 4, or 5.

8. A method of combatting a weed which comprises applying to the weed or its habitat a herbicidally effective amount of a compound according to claim 1.

4,187,101

1-ACYLOXYMETHYL-4,5-DICHLORO-IMIDAZOLE DERIVATIVES AND THEIR USE AS HERBICIDES

Florin Seng; Klaus Sasse, both of Berg.Gladbach; Gunther Beck; Ludwig Eue, both of Leverkusen, and Robert R. Schmidt, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengeselleschaft, Leverkusen, Fed. Rep. of Germany

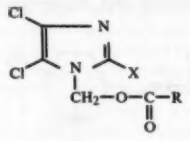
Division of Ser. No. 835,093, Sep. 21, 1977. This application Sep. 27, 1978, Ser. No. 946,252

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1976, 2646142

Int. Cl.[2] C07D *233/90*; A01N *9/22*

U.S. Cl. 71—92 **10 Claims**

1. A 1-acyloxymethyl-4,5-dichloro-imidazole-2-carboxylic acid derivative of the formula



(I)

wherein

X represents trifluoromethyl or cyano and

R represents alkyl with 1 to 6 carbon atoms.

7. A method of combatting a weed which comprises applying to the weed or its habitat a herbicidally effective amount of a compound according to claim 1.

4,187,102

METHOD FOR CONTROLLING THE TEMPERATURE OF THE MELT DURING PNEUMATIC REFINING OF STEEL

Richard J. Choulet, Phoenix, Ariz., and Stewart K. Mehlman, Tarrytown, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Aug. 24, 1978, Ser. No. 936,397

Int. Cl.[2] C21C *5/34*

U.S. Cl. 75—60 **9 Claims**

1. A method for controlling the temperature of a melt selected from the group consisting of carbon steel and low alloy steel, during subsurface pneumatic refining thereof, comprising adding to said melt before starting the injection of refining oxygen:

(a) a fast oxidizing element characterized by having: its oxidation thermodynamically favored over carbon at steelmaking temperatures, the amount of heat released by its oxidation greater than 1100 BTU/normal ft^3 of oxygen, its oxide not strongly acidic in conventional steelmaking slags, and a vapor pressure not substantially greater than that of iron, the amount of said fast oxidizing element added being such that the total amount thereof in the melt is sufficient, when oxidized, to raise the temperature of the melt to the desired temperature before substantial decarburization begins, and

(b) a slow oxidizing element characterized: by having its oxidation thermodynamically similar to that of carbon at steelmaking temperatures and at partial pressures of carbon monoxide experienced during subsurface pneumatic refining and by having the amount of heat released by its oxidation together with that of carbon substantially equal to the steady state heat losses during decarburization, the amount of said slow oxidizing element added being such that the total amount thereof in the melt is sufficient, when oxidized, to maintain the temperature of the melt within the desired temperature range during decarburization,

whereby the temperature of the melt at the end of the refining period is at least equal to the desired tap temperature.

4,187,103

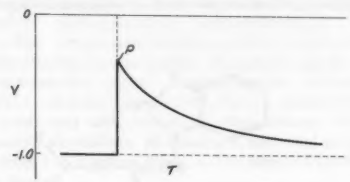
TREATED PHOTOCONDUCTIVE TITANIUM DIOXIDE SHEET

William L. Chambers, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 867,738, Oct. 20, 1969, Pat. No. 3,859,089, which is a continuation-in-part of Ser. No. 730,225, May 20, 1968, abandoned. This application Jul. 17, 1974, Ser. No. 489,448

Int. Cl.[2] G03G *5/04, 16/00, 13/24, 13/14*

U.S. Cl. 430—40 **8 Claims**



1. A photoconductive sheet comprising a base having a coating thereon comprising

(1) photoconductive titanium dioxide having a characteristic relaxation time of less than about 4 minutes and being

present to the extent of about 40% to about 60% by volume of said coating;

(2) an insulating binder providing a matrix for said photoconductive titanium dioxide having an acid number below 70; and

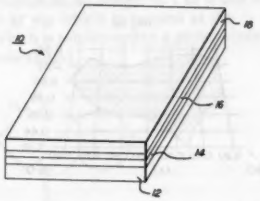
(3) from about 0.1×10^{-6} to about 15×10^{-6} equivalents per square meter of total photoconductive titanium dioxide surface of at least one organic acid or organic acid salt decay retarder having at least 6 carbon atoms per molecule, said photoconductive sheet being capable of the electrophotographic production of more than about ten copies of substantially similar contrast per exposure to a light image.

4,187,104

ELECTROPHOTOGRAPHIC PHOTORECEPTOR WITH COMPOSITE INTERLAYER AND METHOD OF MAKING

Simpei Tutihasi, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 30, 1978, Ser. No. 920,869
Int. Cl.[2] G03G *5/14, 5/082;* B05D *5/12*
U.S. Cl. 430—57 **6 Claims**



1. A method for producing an electrophotographic photoreceptor comprising:

(a) providing a substrate comprising an electrically conductive layer having arrayed on one surface thereof a layer of organic thermoplastic adhesive material having an average thickness of from about 0.5 to about 3.0 microns,

(b) vacuum evaporating a layer of amorphous arsenic triselenide having an average thickness of from about 0.1 to about 1.0 micron over said adhesive layer while maintaining the temperature of said adhesive material above its softening point but below the crystallization temperature of said arsenic triselenide; and

(c) vacuum evaporating a photoconductive layer of selenium or selenium alloy over said arsenic triselenide while maintaining the temperature of said substrate, adhesive material and arsenic triselenide layer below the softening point of said adhesive layer and below the crystallization temperature of selenium or selenium alloys.

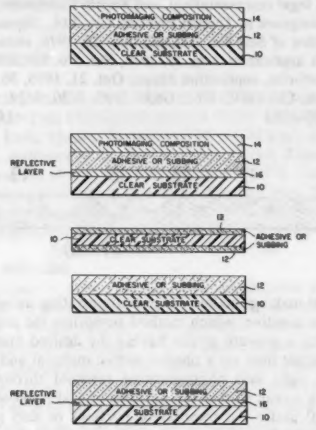
4,187,105

PHOTOSENSITIVE IMAGE FORMING COMPOSITION CONTAINING AT LEAST ONE SUBSTITUTED BIS-DIARYL VINYLIDENE COMPOUND AND/OR AT LEAST ONE SUBSTITUTED BIS-DIARYL IMINE COMPOUND

Eugene Wainer, Shaker Heights, and James M. Lewis, Aurora, both of Ohio, assignors to Horizons Research Incorporated, Cleveland, Ohio

Filed May 23, 1978, Ser. No. 908,668
Int. Cl.[2] G03C *1/52, 5/04, 5/24*
U.S. Cl. 430—336 **22 Claims**

1. In a non-silver photoimaging composition which includes at least one organic halogen compound and at least one colorless bis-aryl compound selected from the group consisting of substituted bis-aryl vinylidene compounds, substituted bis-aryl imine compounds and mixtures thereof, and wherein an image is produced as a result of the imagewise exposure of said composition to a pattern of radiation which causes said organic halogen compound to generate free radicals, the improvement which comprises providing tetraiodoethylene as an organic



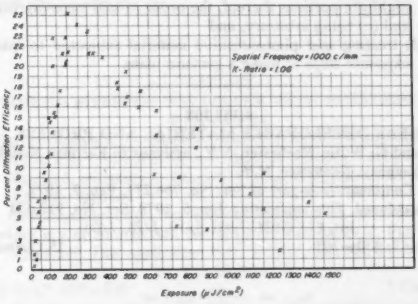
halogen compound present in said composition to activate the formation of a colored image therein from the colorless bis-aryl compound.

4,187,106

PROCESS FOR MAKING PHASE HOLOGRAMS

James W. Gladden, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 23, 1979, Ser. No. 23,217
Int. Cl.[2] G03C *5/04, 5/32*
U.S. Cl. 430—1 **5 Claims**



1. A process for the production of a phase hologram, comprising the steps of:

exposing silver halide photographic material in the exposure plane of a holographic optical system;

developing the exposed photographic material with a non-tanning developer;

bleaching the developed photographic material with a tanning bleach which removes the metallic silver of the metallic silver image areas while tanning the gelatin in the metallic silver image areas; and,

fixing the bleached photographic material with a non-tanning fixing agent to remove the silver halide from the photographic material so as to form a phase hologram of a tanned gelatin in a gelatin matrix.

4,187,107

MAKING GRAVURE PLATE WITH TINT SCREEN

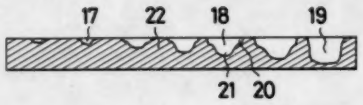
Kokichi Homma, deceased, late of Wako, Japan (by Kenichiro Homma, legal representative), and Yoshio Kameyama, Tokyo, Japan, assignors to Toppan Printing Co., Ltd., Japan

Continuation of Ser. No. 700,319, Jun. 28, 1976, abandoned. This application Aug. 23, 1978, Ser. No. 936,058

Claims priority, application Japan, Oct. 21, 1975, 50/126810

Int. Cl.[2] G03C *5/00; G03F 5/00, 5/20, 5/24*

U.S. Cl. 430—252 **14 Claims**



1. A plate making method for gravure printing using a continuous tone positive, which method comprises the steps of:

(a) placing a gravure screen having the desired number of transparent lines on a photosensitive material and exposing to light said photosensitive material through said gravure screen so that the portions of said photosensitive material under the transparent portions of said gravure screen may be cured,

(b) placing a tint screen having transparent portions and a large number of opaque dots and also placed a continuous tone positive on said photosensitive material and again exposing said photosensitive material to light, the opaque dots of said tint screen being uniform in area, thereby said photosensitive material portions under the transparent portions of said tint screen being curved in response to the darkness of said continuous tone positive so that said curing is shallow in the shadow portions and deep in the highlight portions thereof,

(c) placing said continuous tone positive on said photosensitive material and again exposing the latter to light, thereby said entire photosensitive material being cured in response to the darkness of said continuous tone positive so the said curing is shallow in the shadow portions and deep in the highlight portions thereof, the order of said steps (a), (b), and (c) being arbitrary, and

(d) treating said photosensitive material subjected to said exposure steps to make a gravure plate.

4,187,108

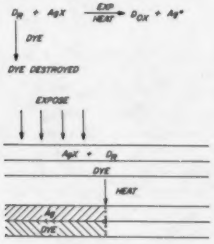
HEAT DEVELOPABLE MATERIAL AND PROCESS

Roland G. Willis, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 766,271, Feb. 7, 1977, abandoned. This application Jun. 5, 1978, Ser. No. 912,633

Int. Cl.[2] G03C *7/00, 5/30, 1/76, 1/06*

U.S. Cl. 430—203 **15 Claims**



1. A heat developable, photographic element for providing a dye enhanced, silver image comprising a support having thereon:

(A) at least one heat developable layer comprising

(i) photosensitive silver halide,

(ii) at least one active silver halide developing agent,

(iii) an activating concentration of a development activator precursor, and

(iv) a polymeric binder, and, contiguous to this layer (A),

(B) at least one layer comprising an azoaniline dye that upon development of a latent image in said layer (A) by uniformly heating is bleached in the non-image areas of said element.

4,187,109

STRONTIUM BARIUM NIOBATE SINGLE CRYSTAL DOPED WITH CE

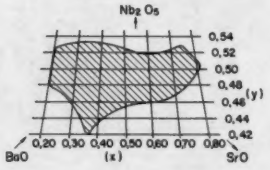
Koichi Megumi; Hirotsugu Kozuka, both of Tokyo; Masayoshi Kobayashi, Hachioji, and Yoshio Furuhata, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 26, 1976, Ser. No. 652,174

Claims priority, application Japan, Jan. 27, 1975, 50-10500

Int. Cl.[2] G03C *1/76, 1/00*

U.S. Cl. 430—2 **4 Claims**



1. An optical element composed of a single crystal consisting essentially of strontium barium niobate, which is represented by the formula $(Sr_xBa_{1-x}O)_{1-y}$ $(Nb_2O_5)_y$ and doped with from 20 to 10,000 ppm of cerium based on the total number of cations of said niobate wherein the values of x and y are represented by coordinate in the hatched area in FIG. 1.

4,187,110

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Morio Yagihara; Mitsugu Tanaka; Takeshi Hirose, and Toshiaki Aono, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 7, 1977, Ser. No. 858,225

Claims priority, application Japan, Dec. 7, 1976, 51-147027

Int. Cl.[2] G03C *1/06*

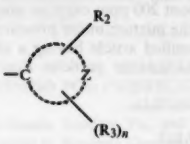
U.S. Cl. 430—544 **7 Claims**

1. A photographic light-sensitive material comprising a support thereon having at least one silver halide emulsion layer containing a coupling compound represented by the following general formula (I):

(I)

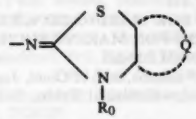
wherein X represents

wherein R_1 represents a phenyl group which can be substituted with one or more substituents, which may be the same or different; R is an aromatic group represented by the general formula (II)



(II)

wherein Z represents an atomic group necessary to form, together with the carbon atom, an aryl group; R_2 represents a nitro group, a cyano group, an acyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, a carbamoyl group, a sulfamoyl group, an alkylsulfonyl group, an arylsulfonyl group, an alkoxysulfonyl group, or an aryloxysulfonyl group; R_3 represents a hydrogen atom, a halogen atom, a nitro group, a cyano group, a thiocyano group, a hydroxy group, an alkoxy group, an aryloxy group, an alkyl group, an alkenyl group, an aryl group, an amino group, a carboxy group, an acyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, a carbamoyl group, an acylamino group, a sulfo group, an alkylsulfonyl group, an arylsulfonyl group, an alkoxysulfonyl group, an aryloxysulfonyl group, a sulfamoyl group or a sulfonamido group and n represents an integer of 1 to 4; and wherein Y is a benzotriazole group which is bonded at the 1- or 2-position thereof and which is substituted by a group represented by the general formula (IIIA)



wherein R_0 represents an aliphatic group, an aralkyl group or an aryl group; and Q represents an atomic group necessary to form an aromatic ring, which can be substituted with one or more of an alkyl group, an alkoxy group and a halogen atom.

7. The photographic light-sensitive material as claimed in claim 1, wherein said photographic light-sensitive material comprises a support having thereon a blue-sensitive silver halide emulsion layer containing a yellow color forming coupler, a green-sensitive silver halide emulsion layer containing a magenta color forming coupler and a red-sensitive silver halide emulsion layer containing a cyan color forming coupler, with at least one silver halide emulsion layer of the photographic light-sensitive material containing the coupling compound represented by the general formula (I).

4,187,111

SENSITIZED POROUS BODIES USEFUL FOR PRODUCING THICK REFRACTIVE INDEX RECORDINGS

Edwin A. Chandross, Berkeley Heights, and Walter J. Tomlinson, III, Holmdel, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 801,783, May 31, 1977. This application May 3, 1978, Ser. No. 902,361

Int. Cl.[2] G03C *1/72, 5/04*

U.S. Cl. 430—2 **4 Claims**

1. An article produced by the process comprising the steps of impregnating a rigid porous matrix having throughout said matrix pores in the range 10 A to 400 A with a photosensitive compound having a reactive group which results in chemisorption to said porous body wherein said photosensitive compound is introduced into said rigid matrix after said rigid matrix is formed and has a sufficiently strong adhesion to said rigid matrix to prevent disengagement during a subsequent development step, permits the introduction of a composition capable of interreacting with said photosensitive compound upon exposure to electromagnetic radiation into said pores, is capable of being deactivated as a photosensitizer by exposure to electromagnetic radiation, and is capable of inducing said composition to change refractive index upon further exposure to electromagnetic radiation.

4,187,112

PHOTOSENSITIVE PLATE CONTAINING NITROGEN CONTAINING CONDENSATION TYPE POLYESTERS

Kuniomi Etoh; Masaru Nanpei, and Morio Miyagi, all of Otsu, Japan, assignors to Toyobo Co., Ltd., Osaka, Japan

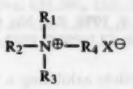
Continuation of Ser. No. 693,178, Jun. 7, 1976, abandoned, which is a continuation of Ser. No. 525,107, Nov. 19, 1974, abandoned. This application Oct. 20, 1977, Ser. No. 843,850

Claims priority, application Japan, Nov. 19, 1973, 48-130390

Int. Cl.[2] G03C *1/68, 1/78, 5/00*

U.S. Cl. 430—285 **13 Claims**

1. A water or dilute aqueous acid-developable photosensitive plate for preparation of a printing plate and containing a layer of a water-soluble photosensitive resin composition which consists essentially of a condensation type polyester having a nitrogen atom in the ammonium salt form in the main or a side chain thereof, said polyester containing at least 1×10^{-3} mole of the nitrogen atom in the ammonium salt form per 1 gram, from 5 to 150% by weight, with respect to said polyester of a photopolymerizable unsaturated monomer and from 0.01 to 5% by weight with respect to the total amount of said polyester and the photopolymerizable unsaturated monomer of a photosensitizer, said polyester having the formula:



wherein R_1, R_2, R_3 and R_4 are each a hydrogen atom, a substituted or unsubstituted hydrocarbon group or a condensation type polyester chain, at least one of R_1 to R_4 representing said condensation type polyester chain, and X is an anion paired with the ammonium ion.

4,187,113

VOIDED FILMS OF POLYESTER WITH POLYOLEFIN PARTICLES

Carl F. Mathews; Christopher Deverell, both of Hitchin; Gordon E. A. Pears, Harpenden, and Peter G. Knowles, Luton, all of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 629,000, Nov. 5, 1975, abandoned, which is a division of Ser. No. 407,951, Oct. 19, 1973, Pat. No. 3,944,699. This application Nov. 3, 1977, Ser. No. 848,354

Int. Cl.[2] G03C *1/78*

U.S. Cl. 430—533 **7 Claims**

1. A photographic print material, which comprises a support in the form of an opaque molecularly oriented and heat set film produced from a blend of particles of a linear polyester produced by condensing at least one dicarboxylic acid, a lower alkyl diester thereof or bis-p-carboxyphenoxyethane with at least one glycol and from 3 to 27% by weight of particles of a homopolymer or copolymer of ethylene or propylene sufficient to increase the opacity of the resulting film, the homopolymer or copolymer being dispersed in the form of discrete particles throughout the oriented and heat set film, said support including voids between the regions of the linear polyester and the homopolymer or copolymer of ethylene or propylene sufficient to give said support a total luminous transmission not in excess of 20%, said support carrying a photosensitive silver halide-containing gelatinous layer.

4,187,114

HARDENING PROTEINACEOUS MATERIALS

Hendrik E. Kokelenberg, Merksem; Francis J. Sels, Kontich, and George F. Van Veelen, Mortsel, all of Belgium, assignors to AGFA-Gevaert N.V., Mortsel, Belgium

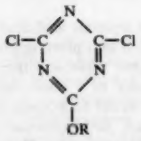
Filed May 9, 1978, Ser. No. 904,278

Claims priority, application United Kingdom, May 10, 1977, 19577/77

Int. Cl.[2] G03C *1/30*

U.S. Cl. 430—510 8 Claims

1. A process for hardening proteinaceous material, which comprises treating the proteinaceous material with an aqueous solution of the partial hydrolysis product of a 2,4-dichloro-6-alkoxy-s-triazine with a water-soluble tertiary phosphate and/or a water-soluble borate, said 2,4-dichloro-6-alkoxy-s-triazine corresponding to the formula:



wherein R is a lower alkyl or alkoxyalkyl group.

4,187,115

ANORTHITE GLASS-CERAMICS

Richard F. Reade, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Sep. 1, 1978, Ser. No. 938,971

Int. Cl.[2] C03C *3/22*

U.S. Cl. 106—39.8 4 Claims

1. A glass-ceramic article exhibiting a Log ρ at 250° C. of about 10–16, a Log ρ at 350° C. of about 9–13, a dielectric constant at 10^5 Hz of about 10–13, a dielectric constant at 10^6 Hz of about 9–13, and a coefficient of thermal expansion over the range 20°–300° C. of about $35–65 \times 10^{-7}$/°C. consisting essentially of a fine-grained crystal phase uniformly dispersed within a glassy matrix and constituting greater than 50% by volume of the article, said crystal phase consisting essentially of triclinic anorthite and rutile and being formed through crystallization in situ from a glass body consisting essentially, expressed in weight percent on the oxide basis, of about 10–18% CaO, 29–35% Al_2O_3, 30–39% SiO_2, and 13–20% TiO_2.

4,187,116

SILICON NITRIDE-SILICON CARBIDE COMPOSITE MATERIAL

Frederick F. Lange, Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 860,403, Dec. 13, 1977, which is a continuation of Ser. No. 670,582, Mar. 25, 1976, abandoned, which is a continuation-in-part of Ser. No. 499,941, Aug. 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 351,744, Apr. 16, 1973, abandoned. This application Oct. 16, 1978, Ser. No. 951,937

Int. Cl.[2] C04B *35/52, 35/58*

U.S. Cl. 106—44 5 Claims

1. A method of forming a composite material comprising the steps of:

(a) providing a mixture of silicon nitride powder and silicon carbide powder, the silicon carbide powder not exceeding about 40 percent by volume and having an average particle size less than about 5 microns;

(b) adding to the mixture an effective amount of a densification aid selected from the group consisting of: magnesium oxide (MgO), a member of the group of rare earth oxides, lithium oxide (LiO_2) and aluminum oxide (Al_2O_3), the mixture of silicon nitride, silicon carbide and densification aid containing less than about 200 ppm calcium; and

(c) sintering and densifying the mixture under pressure in a hot-press to provide a densified article having a silicon nitride matrix with silicon carbide particles dispersed therein.

4,187,117

TITANIUM SLAG-COKE GRANULES SUITABLE FOR FLUID BED CHLORINATION

Michel Gueguin, Tracy, Canada, assignor to Quebec Iron and Titanium Corporation - fer et Titane du Quebec, Inc., Sorel, Canada

Division of Ser. No. 811,761, Jun. 30, 1977, Pat. No. 4,117,076, which is a continuation of Ser. No. 675,954, Apr. 12, 1976, abandoned. This application Apr. 24, 1978, Ser. No. 899,166

Int. Cl.[2] C04B *35/52;* C01G *23/02*

U.S. Cl. 106—56 3 Claims

1. As an article of manufacture, controllably abradable coked grains for obtaining titanium values therefrom comprising TiO_2 and a carbonaceous material in a weight ratio of from 1.5 to 2.5:1, respectively, of a hydrogen content of less than 0.2% by weight, as a binder therefor 0.25% to 1.00% per dry weight of the TiO_2 and carbonaceous material, a mesh size from 8 to 150; a crushing strength from 100 to 2000 g/mmD, and a pore size of 1 to 50 microns.

4,187,118

CONCRETE COMPOSITION FOR MAKING CONCRETE MOLDINGS AND METHOD FOR MAKING SUCH CONCRETE MOLDINGS

Koji Nakagawa, and Yoshiharu Watanabe, both of Oumi, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 824,053, Aug. 12, 1977, abandoned. This application Apr. 17, 1978, Ser. No. 897,108

Int. Cl.[2] C04B *7/35*

U.S. Cl. 106—89 14 Claims

1. A method for making concrete moldings of high strength which comprises adding, to 400–600 kg. of Portland cement per unit m^3 of concrete, 3–30% by weight of insoluble (Type II) anhydrous calcium sulfate based on the weight of said Portland cement and 0.1–3% by weight of cement dispersing agent based on the weight of the Portland cement, at a water/cement ratio of 25–35% by weight and in fine aggregate percentage of 30–50%, forming the moldings in the usual manners, subsequently subjecting the moldings thus formed to pre-steaming and thereafter effecting steam curing under atmospheric pressure.

4,187,119

GLUE FOR ARTICLES IN THE TOBACCO INDUSTRY

Jean-Claude Battard, Saran, and Jean Buisson, Orleans, both of France, assignors to Service d'Exploitation Industrielle des Tabacs et des Allumettes, Paris, France

Continuation of Ser. No. 685,750, May 13, 1976, abandoned. This application Jan. 26, 1978, Ser. No. 872,471

Int. Cl.[2] C09H *11/00*

U.S. Cl. 106—126 9 Claims

1. Glue for articles of the tobacco industry such as cigarettes, cigarillos, cigars, filter tips, coupling-sleeves, etc., characterized by the fact that at ambient temperature it is in gel form consisting essentially of water and gelatine, the gelatine concentration being in the 25–180% range in relation to the water weight, and a minor quantity of plasticizer for the gelatine in aqueous solution, selected from the group consisting of sodium alginate, carragenate, guar gum, gum arabic, pectine, galactomanne methylcellulose, sodium carboxymethylcellulose and acetylated starch, the plasticizer's concentration being within the 0,25–8% range in relation to the weight of the gelatine alone, and being adjusted so that the temperature at which the liquefied gel viscosity remains superior to 50 centi-

poises and becomes lower than 1000 centipoises is within the 40°–70° C. range.

4,187,120
METHOD FOR PURIFICATION OF POLYHYDRIC ALCOHOLS

Robert Kunin, Yardley, Pa., and Louis I. Blaine, Orange, N.J., assignors to Ecodyne Corporation, Chicago, Ill.

Filed May 30, 1978, Ser. No. 910,628
Int. Cl.² C13D *3/14*
U.S. Cl. 127—46 A **12 Claims**

1. A method for purification of a polyhydric alcohol comprising:

preparing a liquid slurry mixture of filter particles, including an anion exchange resin, a cation exchange resin, and a filter aid material, said anion exchange resin particles and said cation exchange resin particles being smaller than about 37 microns;

precoating a porous support means with said slurry mixture to form a precoat layer; and

passing the polyhydric alcohol through said precoat layer and said porous support means to purify the polyhydric alcohol.

4,187,121
CLEAR-RINSE AGENT FOR MECHANICAL DISHWASHERS

Claus-Peter Herold, Mettmann; Dieter Grodau, Hilden, and Theodor Altenschopfer, Dusseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Atkien, Dusseldorf, Fed. Rep. of Germany

Filed May 17, 1978, Ser. No. 906,751
Claims priority, application Fed. Rep. of Germany, May 28, 1977, 2724350
Int. Cl.² B08B *7/04*
U.S. Cl. 134—26 **19 Claims**

13. In the method of washing dishes in a mechanical dishwasher comprising the steps of subjecting the soiled dishes to the forceful spraying of a cleansing liquor containing a dishwashing detergent, rinsing said dishes with a forceful spray of clear water, subjecting the cleaned and rinsed dishes to the forceful spraying of a clear rinse liquor containing an effective amount of a sheeting component, and drying said cleaned dishes, the improvement consisting essentially of employing, as said sheeting component, from 0.05 to 2.6 gm per liter of said clear rinse liquor of a reaction product obtained by reacting under acid catalysis conditions (1) an aldose selected from the group consisting of a reducing monosaccharide having 5 to 6 carbon atoms and an oligosaccharide thereof having from 2 to 4 monosaccharide units, with (2) a polyglycol ether having an average molecular weight of from 190 to 450, in a molar ratio of from 1:0.4 to 1:1.5, said reaction product having a residual quantity of free aldose of less than 4%.

4,187,122
DISHWASHING APPARATUS

Grady W. Query, P.O. Box 18452, Charlotte, N.C. 28218

Filed Nov. 7, 1978, Ser. No. 958,522
Int. Cl.² B08B *3/02*
U.S. Cl. 134—95 **22 Claims**

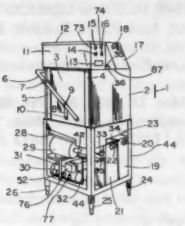
1. A dishwashing apparatus utilizing liquid treating agents in dishwashing comprising:

(a) a dishwashing compartment operative to hold objects to be washed;

(b) a plurality of storage reservoir means operative to store said liquid treating agents in bulk quantities and physically secured onto said dishwashing apparatus;

(c) an air pressure means physically secured on said dishwashing apparatus operative to maintain a constant pressure on said liquid treating agents in said plurality of storage reservoir means physically secured on said dishwashing apparatus;

(d) connecting means secured between said plurality of said storage reservoir means and said dishwashing compartment and operative to provide a means for said liquid treating agents to flow under pressure from said air pressure means into said dishwashing compartment; and

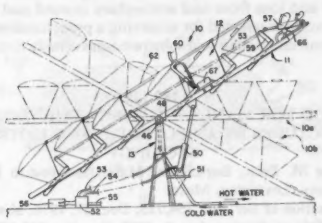


(e) flow switch means electrically controlled and operative to permit said liquid treating agents to flow under pressure from said air pressure means through said connecting means into said dishwashing compartment at pre-determined intervals.

4,187,123
DIRECTIONALLY CONTROLLED ARRAY OF SOLAR POWER UNITS

Richard E. Diggs, 12 A Rd., Carthage, Mo. 64836

Continuation of Ser. No. 624,396, Oct. 21, 1975, abandoned. This application Nov. 15, 1977, Ser. No. 851,718
Int. Cl.² H01L *31/04*
U.S. Cl. 136—206 **8 Claims**



1. A directionally controlled array of solar power units, comprising: a pivotal supporting frame; a plurality of solar power units pivotally mounted on the frame for pivotal movement about two mutually perpendicular axes; conduit means on the frame for flow of cold water to and hot water from each power unit; each power unit including a solar cell for direct conversion of solar energy into electrical energy; lens means on each power unit arranged to concentrate solar energy on the solar cell of that unit; said conduit means connected for flow of cold water in heat exchange relationship with the solar cells to cool the solar cells and heat the water, said hot water thus being available for work; each power unit further comprising a base having a top surface and a bottom surface, an inlet into said base and extending through said base and exiting outwardly through the top surface of the base, a serpentine, open fluid flow troughlike passageway defined in said base top surface and extending from the inlet and a passage extending from the passageway downwardly into the base and thence outwardly through said base, said solar cell overlying the passageway closing the open side thereof to confine fluid flow through the passageway with said fluid contacting one side of said solar cell; and control means connected with the power units and the frame to pivot the power units in response to the

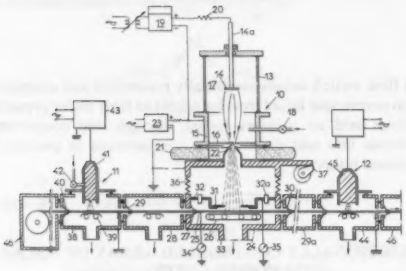
position of the sun to keep the power units pointed at the sun during hours of daylight.

4,187,124

PROCESS FOR DOPING SEMICONDUCTORS

Jean-Claude Muller; Jean-Pierre Ponpon; Joseph Kurek, and Paul Siffert, all of Strasbourg, France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Mar. 15, 1978, Ser. No. 887,076
Claims priority, application France, Mar. 18, 1977, 77 08138
Int. Cl.[2] H01L *21/263;* H01J *37/30*
U.S. Cl. 148—1.5 **12 Claims**



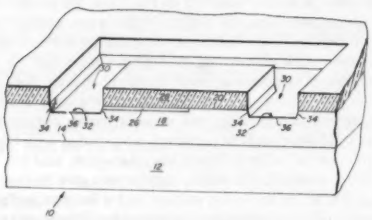
1. A process for doping a semiconductor substrate by ion implantation comprising the steps of striking an electric discharge in an atmosphere containing a gaseous compound of a dopant under a pressure between 0.1 and 10 mm of mercury for creating ions of said dopant; extracting and accelerating a beam of said ions from said atmosphere toward said substrate under a voltage selected for achieving a predetermined doping profile; and circulating said substrate transversely to said beam.

4,187,125

METHOD FOR MANUFACTURING SEMICONDUCTOR STRUCTURES BY ANISOTROPIC AND ISOTROPIC ETCHING

Wolfgang M. Feist, Burlington, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 754,723, Dec. 27, 1976, abandoned. This application Jun. 1, 1978, Ser. No. 911,659
Int. Cl.[2] H01L *29/06, 21/76, 21/302*
U.S. Cl. 148—1.5 **12 Claims**



1. The method of forming integrated circuits comprising the steps of:

(a) disposing an etch-resistant mask, having windows formed therein, over a surface of a semiconductor body;

(b) etching isolation grooves into such body by bringing an anisotropic etchant into contact with portions of the surface exposed by the windows to form grooves having side walls which intersect the surface at acute angles and bringing an isotropic etchant in contact with the walls of the etched grooves which are exposed by the windows to etch away portions of the semiconductor body under the etch-resistant mask such that the mask extends over the side walls of the resulting isolation grooves, the bottom walls of such grooves are disposed under the windows, and the side walls of the resulting isolation grooves intersect the surface at acute angles.

4,187,126

GROWTH-ORIENTATION OF CRYSTALS BY RASTER SCANNING ELECTRON BEAM

Fred J. Radd; Don H. Oertle, and Charles N. McKinney, all of Ponca City, Okla., assignors to Conoco, Inc., Ponca City, Okla.

Filed Jul. 28, 1978, Ser. No. 929,043
Int. Cl.[2] H01L *21/263, 21/26*
U.S. Cl. 148—1.5 **5 Claims**

1. A method of producing a thin sheet of oriented crystal semiconductor material comprising:

(a) forming a layer of semiconductor material on a substrate;

(b) subjecting said layer to a vacuum of at least 10^{-6} torr; and

(c) applying a raster scanning electron beam to at least a portion of said layer under said vacuum to melt said portion of said layer and subsequently cause said portion of said layer to assume an oriented crystalline structure.

4,187,127

SURFACE PROCESSING SOLUTION AND SURFACE TREATMENT OF ALUMINUM OR ALUMINUM ALLOY SUBSTRATE

Kuniji Yashiro, Kanagawa; Yukihiko Ayano, Hachiohji, and Yasushi Miyazaki, Ichikawa, all of Japan, assignors to Nihon Parkerizing Co., Ltd., Tokyo, Japan

Filed Nov. 21, 1978, Ser. No. 962,720
Int. Cl.[2] C23F *7/14*
U.S. Cl. 148—6.15 R **12 Claims**

1. A surface processing solution for an aluminum or aluminum alloy substrate consisting of 0.1 to 10 g/liter of one or more compounds selected from the group consisting of inositol di-~hexaphosphates and water soluble salts thereof and 0.1 to 10 g/liter as Ti of a titanium fluoride.

4,187,128

MAGNETIC DEVICES INCLUDING AMORPHOUS ALLOYS

Robert L. Billings, Andover, Mass.; Ho-Sou Chen, Warren; Ernst M. Gyorgy, Madison, and Richard C. Sherwood, New Providence, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 26, 1978, Ser. No. 945,914
Int. Cl.[2] H01F *1/00*
U.S. Cl. 148—121 **6 Claims**

1. Method for the production of a device, said method consisting of:

a. forming a magnetic body consisting essentially of an amorphous low magnetostrictive metallic alloy by cooling said alloy from a melt or by depositing said alloy on a substrate, the composition of said alloy being represented by the formula $(Co_aFe_bT_c)_iX_j$ wherein

i. T is at least one first species selected from the group consisting of Ni, Cr, Mn, V, Ti, Mo, W, Nb, Zr, Pd, Pt, Cu, Ag, Au;

ii. X is at least one second species selected from the group consisting of a first subgroup, consisting of P, Si, B, C, As and Ge and a second subgroup consisting of Al, Ga, In, Sb, Bi and Sn;

iii. i is from 0.7 to 0.9;

iv. $i+j=1$;

v. a is from 0.7 to 0.97; and

vi. b is from 0.03 to 0.25 with $a+b+c=1$,

b. placing the body adjacent to an electrically conductive path, and

c. a characterizing additional step which is carried out either before or after placing said body adjacent to said electrically conductive path, said additional step consisting of heat treating the body by heating at heat treatment temperatures from 125 degrees Centigrade to 200 degrees Centigrade for heat treatment times from 30 minutes to two hours, which heat treatment is selected to yield a body with a temperature stabilized magnetic permeability.

4,187,129

GELLED MECHANICALLY STABLE HIGH ENERGY FUEL COMPOSITION CONTAINING METAL PLATELETS

John J. Bost, Sacramento; Jackie A. Cabeal, Citrus Heights, and Sanders D. Rosenberg, West Covina, all of Calif., assignors to Aerojet-General Corporation, La Jolla, Calif.

Filed May 14, 1962, Ser. No. 195,031
Int. Cl.[2] C06B *45/02, 47/08*
U.S. Cl. 149—21 **13 Claims**

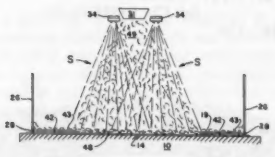
1. A gelled mechanically stable high energy fuel composition comprising a hydrazine selected from the group consisting of hydrazine, unsymmetrical dimethyl hydrazine and mixtures thereof and an amount of metal platelets effective to produce a mechanically stable gel, said platelets having a diameter of less than about 44 microns and an average diameter of about 1 micron, and said metal platelets being composed of a metal selected from the group consisting of aluminum, beryllium and aluminum-beryllium alloy.

4,187,130

METHOD FOR PRODUCING SHAPED GLASS FIBER REINFORCED GYPSUM ARTICLES

Glenn E. Kautz, Sewickley, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 484,304, Jun. 28, 1974, abandoned. This application Feb. 27, 1976, Ser. No. 661,868
Int. Cl.[2] B32B *3/18*
U.S. Cl. 156—42 **7 Claims**



1. A method for forming glass fiber reinforced gypsum products comprising:

1. forming on a water impervious bottom membrane a ribbon comprising:

3–10 parts by weight glass fibers having an average length of ¼ to 4 inches;

100 parts by weight calcium sulfate hemihydrate;

22–45 parts by weight water;

2. covering the said ribbon with a water impervious top membrane to form a sandwich consisting of two said membranes and the said ribbon;

3. removing entrapped gases from the space between the two said membranes;

4. shaping the said sandwich prior to the setting of the said ribbon;

5. setting the said ribbon prior to any deliberate water removal;

6. removing at least a portion of at least one said membrane after the ribbon has set and removing substantially all uncombined water from the said ribbon.

2. A method for forming glass fiber reinforced gypsum products comprising:

1. developing a spray of aqueous calcium sulfate hemihydrate slurry having a weight ratio of water to hemihydrate from 0.22 to 0.45;

2. developing a moving stream of glass fibers having an average length of 0.5 to 4.0 inches;

3. impinging said spray and said stream against each other to produce a slurry-wetted stream of glass fibers;

4. collecting said slurry-wetted stream as a ribbon on a water impervious bottom membrane;

5. covering said ribbon with a water impervious top membrane;

6. removing entrapped gases from the space between the two said membranes to produce a sandwich consisting of the two said membranes and the said ribbon;

7. shaping the said sandwich prior to setting of said ribbon;

8. setting the said ribbon prior to any deliberate water removal;

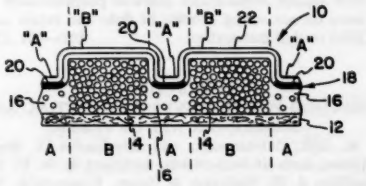
9. removing at least a portion of one said membrane after the ribbon has set and removing substantially all uncombined water from the said ribbon.

4,187,131

RESINOUS POLYMER SHEET MATERIALS HAVING SELECTIVE, SURFACE DECORATIVE EFFECTS AND METHODS OF MAKING THE SAME

Harry A. Shortway, Franklin Lakes; Alan A. Graham, Mercerville, and Charles H. Miller, Lawrenceville, all of N.J., assignors to Congoleum Corporation, Kearny, N.J.

Continuation-in-part of Ser. No. 879,171, Feb. 21, 1978, abandoned, and Ser. No. 942,246, Sep. 14, 1978, abandoned. This application Jan. 22, 1979, Ser. No. 5,266
Int. Cl.[2] B32B *5/20, 31/22, 31/26*
U.S. Cl. 156—79 **12 Claims**



1. A method of making a resinous polymer sheet material having selectively positioned surface decorative effects comprising:

laying down or forming a base layer or substrate;

printing a pattern or design on said base layer or substrate, certain predetermined areas of said printed pattern or design containing a polymerization initiator;

applying to said printed pattern or design of said printing ink composition a resinous wear layer containing substantially uniformly therein a reactive polymerizable monomer;

mechnically embossing the surface of said resinous wear layer to provide thereon a flat, dead or dull mat texture, said mechanical embossing taking place at a sufficiently elevated temperature as to cause said polymerization initiator to (1) bring about polymerization and/or cross-linking of said reactive polymerizable monomer in those portions of said resinous wear layer lying directly over said polymerization initiator in said certain predetermined areas of said printed pattern or design and (2) to increase the melt viscosities of such portions;

and exposing said base layer or substrate and said resinous wear layer to a more elevated temperature as to cause the surfaces of said resinous wear layer to soften and melt to flow and lose their flat, dead or dull mat texture and to become sleek, smooth, glossy or lustrous, except in those

portions of said resinous wear layer containing polymerized and/or cross-linked reactive polymerizable monomers and increased melt viscosities, which portions do not soften or melt or flow but retain their flat, dead or dull mat texture to contrast with said sleek, smooth, glossy or lustrous finish portions.

9. A method of making a resinous polymer sheet material having selectively positioned surface decorative effects comprising:

laying down or forming resinous wear layer on a textured or embossed surface to create a correspondingly textured or embossed surface on said resinous wear layer thus giving the same a flat, dead or dull mat textured or embossed finish, said resinous wear layer containing substantially uniformly therein a reactive polymerizable monomer;

printed a pattern or design on said resinous wear layer, certain predetermined areas of said printed pattern or design containing a polymerization initiator capable of bring about the polymerization and/or cross-linking of said reactive polymerizable monomer;

heating said resinous wear layer and said printed pattern or design to a sufficiently elevated temperature at which said polymerization initiator brings about polymerization and/or cross-linking of said reactive polymerizable monomer in those portions of said resinous wear layer lying directly under said polymerization initiator in said certain predetermined areas of said printed pattern or design;

applying a base layer or substrate to said printed pattern or design of said printing ink composition;

removing said textured or embossed surface from said resinous wear layer; and

heating said resinous wear layer and said base layer or substrate and said printed pattern or design to a sufficiently elevated temperature to cause the surface of said resinous wear layer to soften and melt to flow into a sleek, glossy or lustrous finish only in those areas not containing any polymerized and/or cross-linked reactive polymerizable monomer, whereas those other areas containing polymerized and/or cross-linked reactive polymerizable monomers do not soften or melt or flow and retain said flat, dead or dull mat texture.

4,187,132

METHOD FOR TRANSVERSELY CUTTING AND HEMMING A WEB OF FABRIC

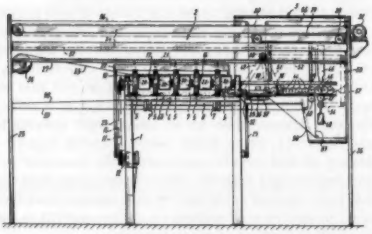
Jan A. Dijk, Winterswijk, and Everhardus J. Hegeman, Wierden, both of Netherlands, assignors to B. V. Weverij Voorheen J. H. Meijerink & Zonen, Winterswijk, Netherlands

Filed Oct. 27, 1977, Ser. No. 846,077

Claims priority, application Netherlands, Oct. 27, 1976, 7611918

Int. Cl.[2] B32B *31/18;* D03D *47/50*

U.S. Cl. 156—88 **3 Claims**



1. A method for transversely cutting and hemming a web of fabric including the steps of moving said web along a longitudinal direction, scanning the region where the web must be cut through with the aid of a number of scanners disposed along a line A perpendicular to the direction of movement of the web, automatically stopping said web each time each scanner interrupts the drive of the corresponding part of the width of the web, and, finally, setting the web in motion again, and said method further comprising the steps of transversely cutting and hemming said web, the improvement wherein steps of cutting and hemming said web of fabric comprises moving cutting elements and hemming elements along said line A in a transverse direction of said web during web stoppage for cutting said web and for hemming the edges being cut.

4,187,133

METHOD FOR MANUFACTURING A CLUTCH FACING

Yasunobu Yamamoto, Chiryu; Ryoichi Tomikawa; Toshiaki Sakabe, both of Toyota, and Yasuhiro Matsumoto, Toyoake, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Aug. 19, 1977, Ser. No. 826,132

Claims priority, application Japan, Aug. 26, 1976, 51-102054

Int. Cl.[2] B32B *5/00;* F16D *69/02*

U.S. Cl. 156—166 **6 Claims**

1. A method of manufacturing a clutch facing, comprising:

mixing graphite and phenolic resin to form a graphite mixture;

soaking an asbestos fiber string within said graphite mixture;

producing a soaked asbestos fiber string comprising a phenolic resin content of 14–24 weight percents and graphite content of 1–8 weight percents for every 100 weight percent of said soaked asbestos fiber string; and

bonding said soaked asbestos fiber string to said clutch facing wherein the Rockwell hardness of said clutch facing is between 20–60 on the Moh scale.

4,187,134

PROCESS FOR MAKING A GAME BALL

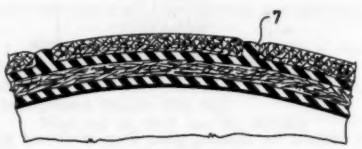
Věroslav Švub; Milan Burian, both of Prostějov; Vladimír Uruba, and Zdeněk Figalla, both of Gottwaldov, all of Czechoslovakia, assignors to GALA, narodni podnik, Prostejoy-Krasice,, Czechoslovakia

Filed Apr. 11, 1978, Ser. No. 895,360

Claims priority, application Czechoslovakia, Apr. 13, 1977, 2406/77; Apr. 13, 1977, 2408/77

Int. Cl.[2] B65H *81/00*

U.S. Cl. 156—170 **6 Claims**



1. A process for making a molded game ball which comprises,

(a) wrapping a layer of fibrous material around an inflated rubber bladder to form an inner body having a configuration corresponding to that of said bladder,

(b) applying a rubber sheet having a thickness of between 0.4 to 1.5 mm around said inner body, said rubber sheet comprising a rubber composition containing from 2.7 to 3.6 percent by weight of a first accelerating agent and from 0.2 to 0.4 percent by weight of isobutylidene-bis-4,6-dimethylphenol, said weight percentages based on the weight of the rubber composition,

(c) imprinting the applied rubber sheet with a pattern to serve as a guide for subsequent application of outer cover segments,

(d) subsequently applying a plurality of discrete cover segments to said rubber sheet conforming to said pattern, the

peripheral edges of all of said cover segments being slightly spaced one from another, thereby forming a series of grooves on the semi-finished game ball,

(e) pressing the semi-finished game ball in a smooth mold for a period of from 1.5 to 10 minutes at temperatures ranging between 90° and 150° C., vulcanizing, plasticizing, and causing a portion of said rubber composition to flow into and substantially fill said series of grooves and to affect additional binding of said cover segments, and

(f) thereafter cooling the game ball so produced.

4,187,135

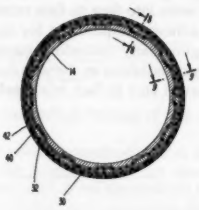
FIBER REINFORCED COMPOSITE SHAFT WITH METALLIC CONNECTOR SLEEVES MOUNTED BY LONGITUDINAL GROOVE INTERLOCK

Derek N. Yates, Los Gatos, and John C. Presta, San Jose, both of Calif., assignors to Celanese Corporation, New York, N.Y.

Filed Mar. 27, 1978, Ser. No. 890,231

Int. Cl.[2] B31C *13/00*

U.S. Cl. 156—187 **12 Claims**



1. A method of forming a tubular fiber reinforced composite shaft comprising the steps of:

positioning a metal sleeve having circumferentially spaced recesses upon the outer periphery thereof upon a segment of a mandrel, said recesses each having a dimension in the longitudinal direction;

applying fibrous material bearing a non-solidified resinous material upon said mandrel and over said recesses in said sleeve;

arranging a plurality of pressing members in radially inwardly pressing relationship with said previously applied fibrous material and in overlying relationship with said recesses to press portions of said previously applied fibrous material into said recesses while bearing said non-solidified resinous material thereon;

applying additional fibrous material bearing said non-solidified resinous material to said previously applied fibrous material and around said pressing members;

solidifying said resinous material with the pressed portions of said previously applied fibrous material being positioned in said recesses to create a torsion-transmitting connection with said metal sleeve; and

removing said mandrel.

4,187,136

METHOD OF MAKING A GRADUATED DENSITY LIQUID FILTER ELEMENT

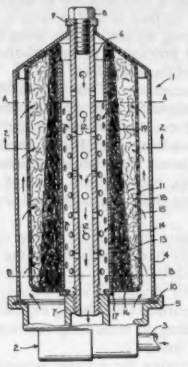
William G. Nostrand, Stoughton, Wis., assignor to Nelson Industries, Inc., Stoughton, Wis.

Filed Apr. 14, 1978, Ser. No. 896,182

Int. Cl.[2] B31C *13/00;* **B65H** *81/08*

U.S. Cl. 156—192 **4 Claims**

1. A method of producing a liquid filter element, comprising the steps of forming a layer of first filtering media having a pair of longitudinal side edges and a pair of ends, forming a layer of second filtering media having different filtering characteristics than said first filtering media, disposing said second filtering media in at least partially overlapping relation with said first filtering media, said second filtering media having an edge bordering said overlapped area and disposed in non-perpendicular relation to the longitudinal side edges of the first filtering media, and winding the overlapped first and second filtering media into a coil in a manner such that said side edges are



disposed at the ends of said coil to provide a generally cylindrical filter element, whereby the cylindrical filter element has a progressively graduated density along at least a portion of its axial length.

4,187,137

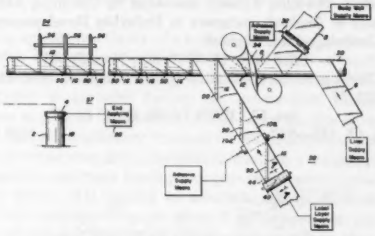
METHOD FOR FORMING A COMPOSITE CONTAINER INCLUDING A PERFORATED LABEL LAYER

Ronald A. Beauchamp, Creve Coeur, Mo., assignor to Boise Cascade Corporation, Boise, Id.

Division of Ser. No. 789,084, Apr. 20, 1977. This application Mar. 21, 1978, Ser. No. 888,783

Int. Cl.[2] B65H *8/00*

U.S. Cl. 156—195 **2 Claims**



1. The method of manufacturing a composite container for dough products and the like, comprising the steps of

(a) helically winding on a mandrel an impervious inner liner layer strip (**6**);

(b) helically winding a fibrous body wall layer strip (**8**) in the same sense as, and in adhesively bonded relation on the external surface of, said helically-wound inner liner layer, said body wall layer being wound to define a helical unbonded butt joint (**12**), and said liner layer including a helically extending folded expansible portion (**6***a*, **6***b*) bonded to said body wall layer on both sides of, and extending in straddling relation across, said body wall helical butt joint, one edge portion (**6***a*) of said liner layer terminating adjacent a first side of said body wall helical butt joint, the other edge portion of said liner layer having a first portion (**6***b*) which extends from the other side of said butt joint across and beyond said butt joint, and a reversely folded second portion (**6***c*) which extends between said one edge portion and said

first portion back toward said butt joint, the length of said second portion extending substantially the length of said first portion and terminating adjacent the edge of said one edge portion, the fold line (**6***d*) between said first and second liner portions extending helically the length of the laminate section, the outer surface of said reversely folded second liner portion (**6***c*) being secured to the inner surface of said liner layer one edge portion to permit relative expansion of said first and second liner portions;

(c) forming a succession of longitudinally-spaced generally transversely extending lines of perforations (**16**) in a label layer strip (**10**), each of said lines of perforations extending from one longitudinal edge (**10***a*) of the label layer strip and terminating adjacent the other longitudinal edge (**10***b*) of the label layer strip, each of said lines of perforations being discontinuous to define in said label layer an imperforate portion (**10***e*);

(d) helically winding the label layer strip in the same sense as, and in adhesively-bonded relation on the external surface of, said body wall layer, thereby to form a tubular laminate, said label layer being wound in edge-overlapping relation with said one edge portion (**10***a*) being exposed, said imperforate portions extending in straddling relation across said body wall layer butt joint;

(e) transversely cutting the tubular laminate along longitudinally spaced lines of circumferential end cuts (**50**) contained in planes normal to the longitudinal axis of the tubular laminate, thereby to define a plurality of cylindrical laminate sections, each of said lines of perforations being adjacent, spaced from and generally parallel with the associated circumferential end cut; and

(f) fastening to the end of the laminate section adjacent the line of perforations a metal end closure member (**4**), whereby the label may be torn from the container assembly along a circumferential perforated tear line adjacent the metal end closure member, and further whereby upon removal of said label layer from the container, the butt joint is expanded by the pressurized packaged product to automatically open the liner layer by shearing or tearing.

4,187,138

SLICING WEB MATERIAL

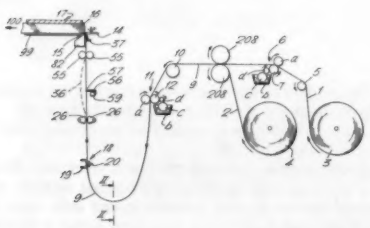
Peter J. Thwaites, Eltisley, and John N. Thornton, Abbotsley, both of England, assignors to Dufaylite Developments Ltd., Cambridgeshire, England

Filed Nov. 16, 1977, Ser. No. 851,907

Claims priority, application United Kingdom, Nov. 16, 1976, 47627/76

Int. Cl.[2] **B32B** *31/00;* **B65C** *11/04*

U.S. Cl. 156—512 **26 Claims**



1. Apparatus for producing structural honeycomb material from web material provided in the form of a plurality of superposed webs by cutting sections from the web material by transverse cutting and joining the sections together, which apparatus comprises a blade formed with a linear cutting edge, releasable clamping means for clamping the sections in turn so that they project in turn beyond said edge, a linear guide parallel with the edge, a mounting movable to and fro along the linear guide, a blade carried by the mounting and formed with a circular peripheral cutting edge positioned to overlap the linear cutting edge, in web-material cutting association therewith, a drive for moving the mounting to and fro along the guide in a continuous cyclic movement in which the mounting is moved in a first direction to a first reversal position, reversed in its motion, moved in the opposite direction to a second reversal position and again reversed in its motion for further movement in said first direction, said blades cooperating to cut the web material transversely when the mounting is moving to or fro over an intermediate part of its cyclic movement between the reversal positions to cut off the then projecting section of the web material and leave the remainder of the web material with a cut-edge at the position of the linear cutting edge, advancing means arranged to advance a section of the web material towards said clamping means whilst the mounting is moving over said intermediate part of its motion actuating means operable to release the clamping means temporarily whilst the mounting is travelling outside said intermediate part of its motion and thereby permit said section of the web material to project in its turn beyond said edge, supply means for providing the superposed webs by bringing a plurality of separate webs into face to face relationship, said supply means having adhesive applicators for securing the webs together by longitudinally extending bands of adhesive, and means for applying adhesive to the web material to join the cut sections together in face to face relationship.

4,187,139

GROWTH OF SINGLE CRYSTAL BISMUTH SILICON OXIDE

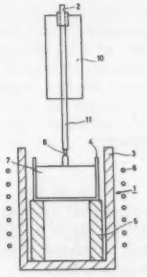
John C. Brice; Owen F. Hill, and Ronald G. Pratt, all of Salfords near Redill, England, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 673,406, Apr. 5, 1976, abandoned, which is a continuation of Ser. No. 441,585, Feb. 11, 1974, abandoned. This application Jun. 10, 1977, Ser. No. 805,539

Claims priority, application United Kingdom, Feb. 14, 1973, 7224/73

Int. Cl.[2] **B01J** *17/18;* **C01G** *29/00*

U.S. Cl. 156—600 **2 Claims**

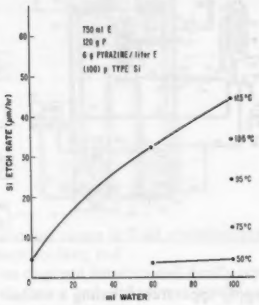


1. In the method of growing a single crystal of bismuth silicon oxide of constant composition by crystalization from a melt of bismuth silicon oxide the improvement wherein the crystallization is carried out in an oxygen containing atmosphere from a melt of $Bi_xSiO_{1.5x+2}$ wherein at the start of the crystallization x has a value of 11.55 to 11.82 or of 12.35 to 14.00 such that the value of x does not have a spread of more than 0.025 throughout the crystal.

4,187,140
METHOD FOR ETCHING SILICON AND A RESIDUE AND OXIDATION RESISTANT ETCHANT THEREFOR

Melvin Berkenblit, and Arnold Reisman, both of Yorktown Heights, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 11, 1978, Ser. No. 950,340
Int. Cl.[2] C09K *13/00*
U.S. Cl. 156—662 21 Claims



6. A method for the controlled etching of thin silicon films including the steps of:

(a) Preparing an etch solution comprising from about 700 ml to about 800 ml ethylenediamine, from about 110 g to about 130 g pyrocatechol, from about 40 ml to about 100 ml of water and a diazine or a derivative thereof in the amount of about the molar equivalent of from about 5 g pyrazine/l to about 10 g pyrazine/l ethylene diamine

(b) applying said etch solution to said silicon at a temperature range of from about 20° C. to about 119° C. and for a time sufficient to effect the desired etch pattern, and thereafter

(c) quenching the etching of said silicon by the addition of water.

17. A method for rapidly etching silicon films including the steps of:

(a) preparing an etchant solution comprising from about 700 ml to about 800 ml ethylenediamine, from about 200 g to about 250 g pyrocatechol, from about 200 ml to about 250 ml of water and a diazine or a derivative thereof in the amount of about the molar equivalent of from about 5 g pyrazine/l to about 10 g pyrazine/l ethylenediamine

(b) applying said etch solution to said silicon at a temperature range of from about 100° C. to about 119° C. and for a time sufficient to etch the desired amount of silicon

(c) quenching the etching of said silicon by the addition of water.

4,187,141
METHOD OF PRODUCING BLEACHED MECHANICAL PULP

Bo Ahrel, Montreal, Canada, assignor to ALF Societe Anonyme, Fribourg, Switzerland

Continuation of Ser. No. 659,377, Feb. 19, 1976, abandoned.
This application Jun. 19, 1978, Ser. No. 916,515
Claims priority, application Sweden, Feb. 24, 1975, 7502060
Int. Cl.[2] D21B *1/02, 1/04, 1/16*
U.S. Cl. 162—23 3 Claims

1. In the method of producing wood pulp in a defibrating apparatus in which wood chips, impregnated with an aqueous solution of a peroxide-containing bleaching composition and compressed to a predetermined dry content with consequent removal of bleaching solution, are introduced into a pressure vessel under superatmospheric pressure and then ground between a pair of discs which rotate relative to one another in a pressure sealed defibrating zone connected to said pressure vessel, the improvement. for minimizing the consumption of peroxide, comprising:

(a) impregnating the wood chips with an aqueous solution of alkali, selected from the group consisting of sodium hydroxide, alkali silicate, alkali carbonate and alkali bicarbonate, and peroxide at a temperature ranging between 50° C. and 80° C. and for a correlated period of time ranging between 10 minutes and 2 hours to ensure presence of peroxide in the wood chips upon introduction thereof into the pressure vessel;

(b) dewatering the thus impregnated wood chips by mechanical compression to a dry content between 35% and 50%;

(c) introducing the thus impregnated and dewatered wood chips into said pressure vessel; and

(d) introducing compressed air into said pressure vessel in an amount sufficient to maintain the impregnated and dewatered wood chips at a temperature below 90° C. and the pressure vessel at superatmospheric pressure while said impregnated and dewatered wood chips are being passed into said defibrating zone to ensure retention of peroxide during the defibration.

4,187,142
METHOD FOR FORMING HIGH STRENGTH COMPOSITES

Dale M. Pickelman, Auburn; William A. Foster, and Ritchie A. Wessling, both of Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 17, 1977, Ser. No. 825,323
Int. Cl.[2] D21H *3/38*
U.S. Cl. 162—146 15 Claims

1. A method for preparing high strength composites comprising

(a) mixing an aqueous slurry of a negatively charged, water-insoluble natural or synthetic fiber or a blend of such fibers with a latex containing a cationic water insoluble copolymer as particles having pH independent bound charges at or near the particle surface in an amount from about 0.07 milliequivalent to about 0.6 milliequivalent per gram of copolymer and a co-additive which is a water-soluble anionic polymer having a degree of polymerization above about 3000, having an available charge of from about 0.3 milliequivalent to about 8 milliequivalents per gram of polymer, having an acyclic carbon-carbon chain backbone and having the capability of retaining its solubility in the presence of polyvalent metal ions at a pH from about 4 to about 7 to form an aqueous suspension of components; the amount of said latex being more than the amount required to cause charge reversal on the fiber but less than the amount which would exceed the capacity of the fiber to hold a wet mat together during processing; and the amount of said co-additive being greater than that required to cause essentially complete retention of the latex on the fiber but less than the amount which would be effective to start redispersion of the components of the aqueous suspension;

(b) removing water from the aqueous suspension to form a wet mat;

(c) drying the mat by heating; said copolymer particles of the latex being deformable at the temperature used in heating the mat.

4,187,143

MANUFACTURE OF FIBRIDS FROM POLY(AMIDE-IMIDE) RESINS

Bruno Sander, Ludwigshafen; Kurt Scherling, Hemsbach; Rolf Steinberger, Schifferstadt, and Eckhard Ropte, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft

Division of Ser. No. 727,585, Sep. 28, 1976, Pat. No. 4,091,058. This application Sep. 9, 1977, Ser. No. 831,749

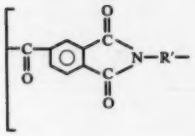
Claims priority, application Fed. Rep. of Germany, Oct. 1, 1975, 2543824

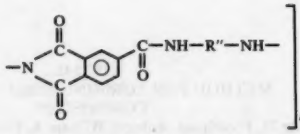
The portion of the term of this patent subsequent to May 23, 1995, has been disclaimed.

Int. Cl.[2] D21F *11/00*

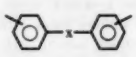
U.S. Cl. 162—157 R **2 Claims**

1. Fibrids consisting essentially of water and poly(amide-imide) resins having the formula





where n is an integer, R′ and R″ are the same or different and respectively are m-phenylene, p-phenylene or



and x is CH_2, O, S, CO or SO_2, said polymer optionally containing additional amide linkages of the formula

—OC—R′—CONH—R″—NH—

in which R′ and R″ have the meanings given above, produced by the process of dissolving a poly(amide-imide) resin in an organic solvent, selected from the group consisting of 1-methyl-2-pyrrolidone, N,N-dimethylformamide and N,N-dimethylacetamide, mixing the solution of the poly(amide-imide) resin in said organic solvent with a liquid in a volume ratio of said solvent to said liquid of from 1:1.5 to 1:5, said liquid being selected from the group consisting of tetrahydrofuran and 1,4-dioxane and said liquid being a non-solvent for said resin but being homogeneously miscible in all portions with water and with the organic solvent, and introducing the resultant solution of said resin, said solvent and said liquid into water while at the same time exposing it to shearing forces which forces are created by mechanically rotated elements at given energy densities in the range of 20 to 80 watt. sec/cm^3 to form fibrids having a length of from 0.1 to 5 mm, a thickness of from 5 to 200 μm, a Schopper-Riegler freeness of from 20° to 90° SR and a specific surface area of from 1 to 80 m^2/g.

4,187,144

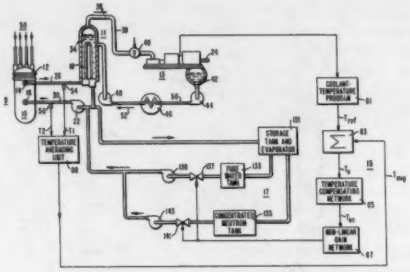
NUCLEAR REACTOR POWER SUPPLY

Norman P. Mueller, Trafford, and Boris A. Mutafelija, Allison Park, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 23, 1977, Ser. No. 799,632

Int. Cl.[2] G21C *7/00, 15/00*

U.S. Cl. 176—24 **11 Claims**



1. Power supply apparatus including a nuclear reactor having a fuel core to be cooled by a coolant in heat-interchange relationship with said core, said coolant to be heated by said core, conductors, connected to said reactor, for conducting said coolant from said reactor and for returning said coolant to said reactor, a turbine, connected to said conductors, to derive energy from the coolant in said conductors, means, connected to said turbine, for varying the power delivered by said turbine, means, connected to said reactor, for adjusting the chemical shim in said coolant, means, connected to said reactor, for deriving the average temperature of said coolant, means, connected to said turbine, for deriving therefrom a programmed reference temperature dependent on the power delivered by said turbine, the said reference temperature correlating said power to corresponding desired coolant temperatures, comparison means, connected to said coolant-temperature deriving means and to said reference-temperature deriving means, for deriving a compensated temperature error, and means connected to said comparison means and to said chemical-shim-adjusting means for changing the chemical shin in said coolant in dependence upon said temperature error in a sense to reduce said compensated temperature error.

4,187,145

HYDRAULIC LATCH SCRAM RELEASE MECHANISM

Richard C. Noyes, New Britain, and Shakir U. Zaman, Windsor, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Jul. 25, 1977, Ser. No. 818,370

Int. Cl.[2] G21C *7/08*

U.S. Cl. 176—36 R **6 Claims**

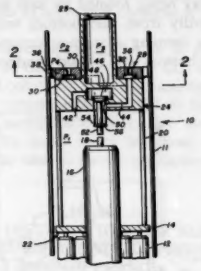
1. In a nuclear reactor scram device for rapidly inserting a control rod bundle downward into the reactor core including a safety duct having a liquid metal coolant flowing upward therethrough, baffle means attached to the duct above the reactor core, the fixed baffle means having one or more recesses on its lower side, a moveable latch plug disposed below the baffle means having an upper surface adapted to enclose the recess and a lower surface in fluid communication with coolant at high pressure, means for supplying low-pressure coolant to the recess, and means for transmitting the pressure of the high-pressure coolant to the recess when a scram is required, wherein the improvement comprises:

said latch plug being connected above and in spaced relation to the control rods of the control rod bundle; and

said means for transmitting pressure are contained within

said plug and actuated from below said plug, said means for transmitting pressure including

a. first conduit means in fluid communication with the recess when the plug is held against the baffle means;



b. a second conduit means in fluid communication with the high-pressure coolant; and

c. valve means disposed between and fluidly separating said first conduit means and said second conduit means.

4,187,146

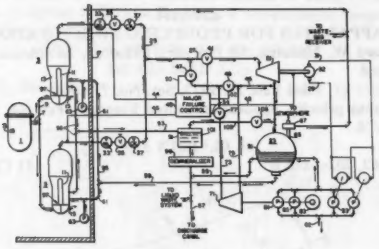
REDUCTION OF RADIOACTIVE EMISSIONS FROM NUCLEAR-REACTOR PLANT

Ti-Ke Shen, Monroeville, Pa., and John R. Coombe, Marblehead, Mass., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 592,858, Jul. 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 378,287, Jul. 11, 1973, abandoned. This application Oct. 13, 1977, Ser. No. 841,772

Int. Cl.[2] G21C *19/30, 15/00*

U.S. Cl. 176—37 **2 Claims**



1. The method of reducing to permissible limits the rejection into the environment of radioactive materials from liquid in the secondary system of a nuclear-reactor plant resulting from primary system to secondary system liquid leakage, the said secondary system including at least one vapor generator cooperatively coupled to a main turbine and an auxiliary turbine for supplying vapor thereto, a blowdown tank, a condenser connected to the tank and turbine outlets, and means for circulating a cooling liquid to cool said condenser, the said method including conducting the secondary liquid contaminated by radioactivity, as the result of said leakage, into said blowdown tank;

conducting the vapor generated by the liquid in said blowdown tank to said condenser;

venting fluid from said condenser;

sensing the existence of radioactive gases in said fluid and selectively discharging said radioactive gases to a waste gas receiver, and after it is filled, discharging said gases into a containment enclosing the reactor in said plant;

discharging the contaminated liquid from said blowdown tank into a demineralizer;

removing radioactive materials from said contaminated liquid in the demineralizer; and,

discharging the resulting non-contaminated liquid to a discharge receiver;

diverting vapor from the main turbine in part through the auxiliary turbine and in part through said consensor to enable the auxiliary turbine;

causing the auxiliary turbine while so enabled to circulate cooling fluid through the condenser;

discharging fluid from the auxiliary turbine to the condenser; and,

transmitting the condensed liquid from the condenser to the vapor generator.

4,187,147

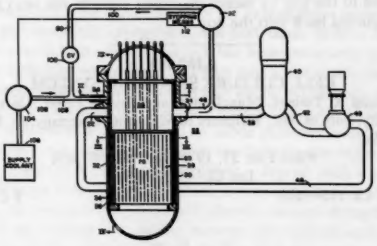
RECIRCULATION SYSTEM FOR NUCLEAR REACTORS

Howard E. Braun, Pittsburgh; Walter J. Dollard, Churchill, and Stephen N. Tower, Franklin Township, Westmoreland County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 20, 1976, Ser. No. 659,867

Int. Cl.[2] G21C *9/00*

U.S. Cl. 176—38 **17 Claims**



1. A recirculation system for nuclear reactor systems including a closed cylindrical nuclear reactor pressure vessel having vessel coolant inlet means and vessel coolant outlet means, a heat exchanger, piping interconnecting said heat exchanger, said vessel coolant inlet means, and said vessel coolant outlet means, a main coolant pump positioned in said piping, and a reactor coolant flowing throughout said nuclear reactor system, said recirculation system comprising:

a cylindrical core barrel positioned in and secured to said pressure vessel, said core barrel and said pressure vessel forming an annular outer space therebetween;

a lower core plate secured to the bottom of said core barrel, said lower core plate having openings therein through which reactor coolant passes;

a core baffle positioned in and secured to said core barrel, said core baffle being secured to said core plate, said core baffle having openings therein adjacent said lower core plate, said core baffle and said core barrel forming an inner space therebetween;

a nuclear core comprising a plurality of fuel assemblies, said core being positioned in said core barrel above said lower core plate;

means for extracting a portion of reactor coolant from said vessel coolant outlet means; and

means for supplying said portion of reactor coolant extracted from said vessel coolant outlet means to said inner space comprising:

a recirculation coolant inlet through said pressure vessel, said recirculation coolant inlet being in fluid communication with said inner space;

recirculation piping interconnecting said recirculation coolant inlet and said means for extracting a portion of said reactor coolant from said vessel coolant outlet means; and

a recirculation pump positioned in said recirculation piping.

4,187,148

PROCEDURE FOR SEPARATING AND RECOVERING MARSH GAS

Veli E. Reijonen, Helsinki, Finland, assignor to VYR-Metoder AB, Taby, Sweden

Continuation of Ser. No. 590,702, Jun. 26, 1975, abandoned. This application Oct. 26, 1977, Ser. No. 845,623

Int. Cl.[2] C12D 3/10

U.S. Cl. 48—197 R 2 Claims

1. A process for producing and recovering marsh gas generated from mud in a bog through bacterial activity comprising the steps of adding to the bog an adjusting chemical to adjust the pH value of the bog mud to be in the range from 5 to 8; adding to the bog a nutrient substance needed by methane bacteria, said substance being selected from the group consisting of phosphorus, potassium and nitrogen fertilizers; adding to the bog a trace element substance needed by methane bacteria, said substance being selected from the group consisting of iron, manganese, magnesium, calcium, nickel, cobalt, copper, zinc and molybdenum; conducting the mud from a depth having a hydrostatic pressure of several atmospheres into a separating space having subatmospheric pressure to separate the gas from the mud; conducting the gas to a place of storage or of use; and conducting the mud from the separating space back to the bog thus accomplishing a cyclic process where said adjusting chemical and said nutrient and trace element substances are added to the bog by means of adding them to the mud that is conducted back into the bog.

4,187,149

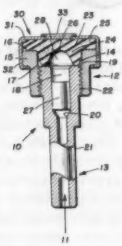
CELL CULTURE SAMPLING SYSTEM

William R. Tolbert, Manchester, and Joseph Feder, University City, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Feb. 27, 1978, Ser. No. 881,458

Int. Cl.[2] C12B 1/00

U.S. Cl. 195—104 9 Claims



1. A cell culture sampling device for withdrawing samples therethrough which comprises a double septum holder having an axial bore therethrough, an upper septum retaining member and a lower septum retaining member, said upper retaining member having lip means to retain immobilized an external septum and said lower retaining member having shoulder means to retain immobilized an internal septum, said lip and shoulder means being spaced apart to therby define a fixed chamber between said immobilized septa.

4,187,150

DISTILLED WATER APPARATUS

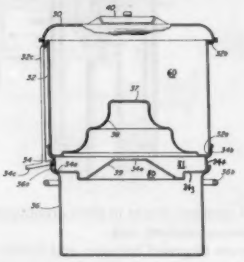
Jay Rich, 8114 NW. 91st Ave., Tamarac, Fla. 33321

Continuation of Ser. No. 675,543, Apr. 9, 1976. This application Apr. 21, 1978, Ser. No. 898,786

Int. Cl.[2] B01D 3/00; A47J 31/04

U.S. Cl. 202—182 6 Claims

1. An apparatus for providing a distilled water infusion beverage, comprising in vapor-sealed arrangement and readily dissemblable a bottom tank in which raw water is placed and which is adapted to be heated, a storage tank nested on but unattached to said bottom tank, and a condensing tank nested on but unattached to said storage tank; said storage tank having an outer side wall, a bottom wall and an inner side wall; said bottom wall and inner wall forming a closed surface; a tubular vapor passageway being formed by said inner side wall and extending upwardly from said bottom wall; said outer and inner side walls forming a storage compartment with said bottom wall; the bottom wall of said condensing tank acting to



seal off rising water vapor and forming an upper compartment for cooling water; said apparatus being so arranged that water vapor rising through said vapor passageway is condensed on said bottom wall of said condensing tank and drips down into said storage compartment; and a perforate infusion chamber positioned across the top portion of said storage tank extending from said outer wall to said inner wall of said storage tank for holding ground coffee or a similar infusion material, whereby said water that drips down from said bottom wall of said condensing tank passes through said infusion chamber on entering said storage tank.

4,187,151

APPARATUS FOR PRODUCING SWEET WATER

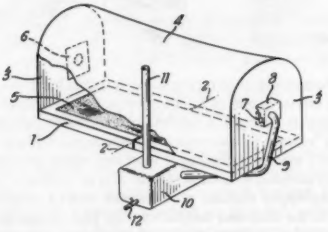
Bernard W. Hanning, 50 Firs Dr., Cranford, Middlesex, England

Filed Feb. 24, 1977, Ser. No. 771,664

Claims priority, application United Kingdom, Feb. 24, 1976, 7238/76

Int. Cl.[2] B01N 3/06

U.S. Cl. 202—185 R 11 Claims



1. Desalination apparatus comprising, in combination,

(a) a variable volume chamber adapted to float on the surface of a body of water and enclose air above the water surface, said chamber having

walls that move in response to wave action to alternately expand and contract the chamber and thereby effect a corresponding alternate decrease and increase in the pressure of the enclosed air,

an air inlet valve connecting the atmosphere with said enclosed air so that atmospheric pressure forces air to

enter said chamber when wave action causes a decrease in pressure of the enclosed air,

an air outlet valve through which enclosed air is forced to leave said chamber when wave action causes an increase in pressure of the enclosed air; and

(b) a water collection and condensation tank having

an air inlet connected to the air outlet of said chamber so that air forced to leave said chamber is forced into said tank, and

an air outlet communicating the air in said tank to the atmosphere so that the air forced into said tank passes through and out of the tank, said tank being postionable beneath the water surface so that air forced from said chamber is cooled as it passes into and through said tank, whereby water vapor in the air condenses and collects in the tank as the air passes through said tank.

4,187,152

EXTRACTIVE DISTILLATION FOR SEPARATING KETONES AND/OR ALCOHOLS FROM PHENOL AND/OR CRESOL

David W. H. Roth, Jr., Convent Station, and David Zudkevitch, Denville, both of N.J., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Dec. 29, 1978, Ser. No. 974,457

Int. Cl.[2] B01D *3/40*; C07C *37/22, 45/24, 29/30*

U.S. Cl. 203—62 **12 Claims**

1. A process for the separation by extractive distillation of one or more alkanols, alkanones, cycloalkanols and/or cycloalkanones from mixtures with phenol and/or cresol which comprises subjecting the mixture to extractive distillation conditions in the presence of an extractive solvent comprising one or more alkylated, unmodified cycloalkyl or aryl derivatives of cyclohexanone or cyclohexanol having up to about 22 carbon atoms.

4,187,153

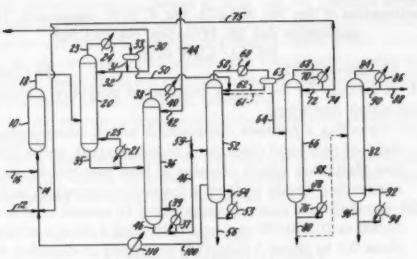
PRODUCTION OF ALKYLENE GLYCOLS

Alan Peltzman, New York, N.Y., and Charles C. Yang, Crosby, Tex., assignors to Halcon Research & Development Corporation, New York, N.Y.

Filed Nov. 14, 1977, Ser. No. 851,025

Int. Cl.[2] B01D *3/36*

U.S. Cl. 203—81 **16 Claims**



1. In a process for removing glycolazeotroping agent from an impure liquid containing the same, said impure liquid also containing ethylene glycol or propylene glycol, lower carboxylate esters of the glycol, carboxylic acid and water wherein said impure liquid is subjected to distillation in a distillation zone to produce an overhead product containing water and glycol-azeotropic agent and a bottoms product containing said glycol, esters and carboxylic acid, the improvement which comprises producing a bottoms product which is substantially free of said glycol-azeotropic agent, by conducting said distillation under conditions sufficient to maintain in said bottoms product a water concentration of at least about 1 weight percent.

4,187,154

METHOD FOR MANUFACTURING SUBSTANTIALLY FLAT DIES

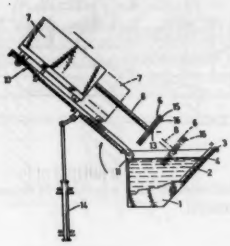
Léon Dewallens, Louvain, Belgium, assignor to Fabrication Belge de Disques "Fabeldis", Molenbeek-Saint-Jean, Belgium

Division of Ser. No. 831,351, Sep. 7, 1977, Pat. No. 4,120,771. This application Aug. 2, 1978, Ser. No. 930,660

Claims priority, application Belgium, Sep. 10, 1976, 170518

Int. Cl.[2] C25D *1/00, 1/10*

U.S. Cl. 204—5 **6 Claims**



1. Method for manufacturing substantially flat dies or similar, particularly a die or counterpart for gramophone records, which are essentially comprised of a part made from a low electric conductivity material which has been previously metallized, including introducing said part into a metal salt-based electrolyte in such a way that said part forms the cathode, the feeding of a relatively low electric current through said electrolyte between said cathode and an anode mounted inside said electrolyte some distance away from the cathode, the adjusting of the current to form by electroplating a deposit with a suitable thickness from said metal which is contained in said electrolyte, on said part, in which said electric current strength is adjusted by varying the spacing between the cathode and the anode inside the electrolyte proper, in which the spacing between the cathode-forming part and the anode is decreased continuously without influencing the electric voltage at the anode and cathode terminals during said closing operation, and maintaining the faces of the substrate and the anode substantially parallel to each other.

4,187,155

MOLTEN SALT ELECTROLYSIS

Vittorio de Nora, Nassau, The Bahamas; Placido M. Spaziante, and Antonio Nidola, both of Milan, Italy, assignors to Diamond Shamrock Technologies S.A., Geneva, Switzerland

Continuation of Ser. No. 774,102, Mar. 7, 1977, Pat. No. 4,146,438, which is a continuation-in-part of Ser. No. 672,279, Mar. 31, 1976, abandoned, which is a continuation-in-part of Ser. No. 673,460, Apr. 5, 1976, abandoned, which is a continuation-in-part of Ser. No. 681,279, Apr. 28, 1976, abandoned, which is a continuation-in-part of Ser. No. 686,943, May 17, 1976, abandoned. This application Sep. 7, 1978, Ser. No. 940,277

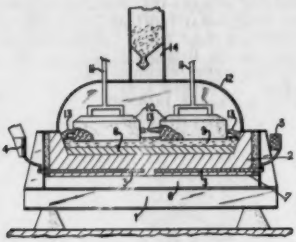
The portion of the term of this patent subsequent to Mar. 27, 1996, has been disclaimed.

Int. Cl.[2] C25B *11/04*; C25C *3/06*

U.S. Cl. 204—67 **25 Claims**

1. In a method of molten salt electrolysis between an anode and a cathode wherein the salt is selected from the group consisting of metal halides and cryolite, the improvement comprising using as the anode and electrode comprised of a self-sustaining matrix of sintered powders of at least one oxycompound of at least one metal selected from the group consisting of lanthanum, terbium, erbium, ytterbium, thorium,

titanium, zirconium, hafnium, chromium, niobium and tantalum and at least one electroconductive agent, the said anode



being provided over at least a portion of its surface with at least one electrocatalyst.

4,187,156

PREPARATION OF DIHYDROAROMATIC HYDROCARBONS

James P. Coleman, Maryland Heights, and John H. Wagenknecht, Kirchwood, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 21, 1977, Ser. No. 862,719

Int. Cl.[2] C25B *3/04*

U.S. Cl. 204—73 R **10 Claims**

1. A process for the preparation of dihydroaromatic hydrocarbons which comprises electrolytic reduction at the cathode in an undivided electrolytic cell by passing a direct electric current through a basic aqueous emulsive electrolysis medium comprising an aromatic hydrocarbon selected from the group consisting of benzene, biphenyl, naphthalene, and alkyl derivatives thereof having 1 to 4 carbon atoms and an aqueous solution of a quaternary ammonium hydroxide to yield the dihydroaromatic hydrocarbon, wherein the electrolytic reduction is conducted in the substantial absence of amine salts.

4,187,157

METHOD AND APPARATUS FOR ISOTOPE CONCENTRATION

Heinz Stehle, Marloffstein, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim, Fed. Rep. of Germany

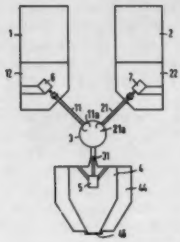
Filed Aug. 28, 1975, Ser. No. 608,703

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1974, 2443216

Int. Cl.[2] B01J *1/10*; B01K *1/00*

U.S. Cl. 204—157.1 R **4 Claims**

1. An isotope concentration method wherein one isotope is separated from a mixture including that one isotope and at least one other isotope, by subjecting the mixture to irradiation with laser radiation exciting at least mainly only said one isotope and while the mixture is mixed with a chemical partner which chemically reacts with said one isotope when it is thus excited, said other isotope being chemically reactive with said partner when sufficiently thermally activated; wherein the improvement comprises limiting the duration of said irradiation to a time period short enough to prevent thermal activation of said mixture to a degree causing said other isotope to chemically react with said partner but long enough to excite said one isotope to a degree causing it to react with said partner, said mixture and said partner being mixed and irradiated while in a reaction vessel, and immediately after the reaction between said one isotope and the chemical partner and before any substantial thermal activation of said mixture the contents of



the vessel being emptied adiabatically into an evacuated chamber.

4,187,158

RAPID PHASE TRANSFORMATION FOR POLYBUTENE-1

Mark P. Mack, Ponca City, Okla., assignor to Conoco, Inc., Ponca City, Okla.

Filed Apr. 6, 1978, Ser. No. 893,855

Int. Cl.[2] C08F *6/00*

U.S. Cl. 204—159.2 **5 Claims**

1. A method for accelerating polybutene phase transformation from type II to type I, the method comprising applying a solvent selected from the group consisting of alkane isomers, cycloalkane isomers, and ethers to polybutene in type II form, said solvent evaporating and causing an immediate phase change to type I form in the area contacted thereby accelerating phase transformation to a stable polybutene type I form throughout the polybutene.

4,187,159

PROCESS FOR FORMING A CROSSLINKED POLYVINYL CHLORIDE FOAM AND PRODUCT THEREOF BY MEANS OF RADIATION CROSSLINKING

Jagadish C. Goswami, New City, N.Y., and Arthur J. Yu, Stamford, Conn., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 538,623, Jan. 6, 1975, abandoned. This application Jul. 28, 1976, Ser. No. 709,563

Int. Cl.[2] C08F *8/00*

U.S. Cl. 204—159.17 **10 Claims**

1. A process for forming a crosslinked polyvinyl chloride foam which comprises:

(a) expanding a plastisol composition which consists essentially of polyvinyl chloride, a blowing agent, and a reactive plasticizer which contains at least two ethylenically unsaturated bonds, to form a foamed composition; and

(b) exposing said foamed composition to radiation of from 50,000 to 20,000,000 electron volts until a dosage of from about 0.5 to about 3 megarads is applied to crosslink the foamed composition and form a dimensionally stable foamed product.

4,187,160

METHOD AND APPARATUS FOR OPERATING AN ELECTROPHORETIC INDICATING ELEMENT

Andreas Zimmermann, Emmenbrücke, Switzerland, assignor to BBC Brown, Boveri & Company, Ltd., Baden, Switzerland

Filed Jul. 18, 1978, Ser. No. 925,763

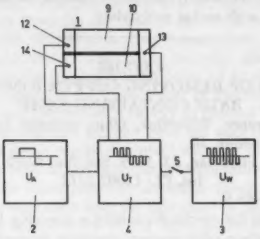
Claims priority, application Switzerland, Nov. 11, 1977, 13774/77

Int. Cl.[2] C25D *13/18*; G02F *1/40*

U.S. Cl. 204—180 R **7 Claims**

1. A method of operating an electrophoretic indicating

element having a suspension containing a pigment which exhibits a switching time, in which said element is driven by a drive signal, comprising:



superimposing an alternating voltage signal directly on said drive signal.

4,187,161

ELECTRICAL ELEMENT OF CONSTRUCTION

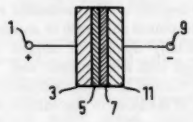
Wulf Fischer, Iserlohn, Fed. Rep. of Germany, assignor to Garching Instrumente, Munich, Fed. Rep. of Germany

Filed Sep. 11, 1978, Ser. No. 941,435

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1978, 2806464

Int. Cl.[2] **G01N** *27/58;* **H01M** *8/10, 8/12;* **H01L** *29/66*

U.S. Cl. 204—195 S **12 Claims**



1. An electrical component having a circuit comprising between at least two points thereof, a solid ionic conductor so that the current between the two points is substantially an ionic current and means for suppressing the electron flow through the ionic conductor without substantially hindering the ion flow therethrough including at least one pn junction formed across the direction of ion flow in or adjoining the ionic conductor and which is capable of being reversed biased relative to the electron flow and wherein the p-conductive and n-conductive zones of the p-n junction comprise material conductive of the same ions as the ionic conductor.

11. An energy cell comprising the component according to claim **1.**

12. A measuring probe for the conversion of chemical characteristics which determine ion current to electrical signals comprising the component according to claim **1.**

4,187,162

ELECTROCHEMICAL CELL

Allen F. Dageforde, Orange, Calif., assignor to Rosemount Inc., Eden Prairie, Minn.

Filed Jun. 26, 1978, Ser. No. 918,856

Int. Cl.[2] **G01N** *27/40*

U.S. Cl. 204—195 P **5 Claims**

1. A cell for electrochemical analysis of a constituent in a sample comprising:

an electrically nonconductive body having an electrolytic reservoir therein, said electrolytic reservoir containing an electrolyte;

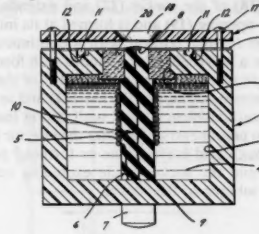
a pair of spaced electrodes, a first of said electrodes being positioned within said reservoir in contact with the electrolyte filling said reservoir;

an opening defined in said body to provide a passageway between said reservoir and the exterior of said body;

means closing said opening including a porous material in contact with the electrolyte in the reservoir and providing a path for electrolyte diffusion therethrough;

said porous material comprising the sole path for transfer of electrolyte from the reservoir to the exterior of the body;

means mounting a second of said electrodes on the exterior of the reservoir within the perimeter of said opening adjacent said porous material and being electrically coupled with the first electrode through electrolyte carried through the porous material;



a thin, flexible polymeric membrane permeable to both said constituent and said electrolyte overlying said porous material and said second electrode; and

cover means overlying said membrane and providing an opening through which the constituent contacts the membrane, the interchange of the constituent and the electrolyte thereby being restricted by said porous material.

4,187,163

ELECTROCHEMICAL EXHAUST GAS OXYGEN SENSOR CONSTRUCTION

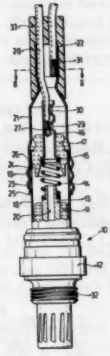
Leo Steinke, Waiblingen, and Helmut Weyl, Schwieberdingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 23, 1977, Ser. No. 863,612

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1977, 2702578

Int. Cl.[2] **G01N** *27/46*

U.S. Cl. 204—195 S **10 Claims**



1. Electrochemical sensor for exposure to the exhaust gases of an internal combustion engine to determine the oxygen content therein having

a socket **(12);**

a solid electrolyte tubular body **(11)** located in the socket **(12);**

electrical connection means **(14, 15, 16, 27)** electrically connected to an electrode on the inside of the tubular body **(11);**

said socket including a tubular portion **(18)** extending in the direction of the open end of the tubular body **(11)** and

being formed with at least one opening (19) in gas communication with ambient air to permit penetration of ambient air to reach the interior of said tubular body (11) and provide a reference oxygen level in the interior of the tubular body; and

a cap (21) extending axially over said tubular portion (18) to protect the interior thereof against ingress of contamination,

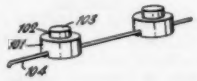
wherein, in accordance with the invention,

said cap (21) fits snugly about the outer surface of the tubular portion (18) of the socket (12) and extends over said at least one opening (19) and is formed at its interior surface facing the tubular portion with a continuous recess extending in a labyrinthine or tortuous path formed between the outside of the tubular portion (18) of the socket (12) and the interior surface of the cap (21) and in gas communication with ambient air and with said at least one opening (19) to permit entry of air into the interior of the socket only through said labyrinthine or tortuous path between said cap and the socket while excluding contamination from the interior of the socket.

4,187,164
ANODE

Michael A. Warne, Brewood, England, assignor to Marston Excelsior Limited, Wolverhampton, England

Filed Jun. 29, 1978, Ser. No. 920,539
Claims priority, application United Kingdom, Jul. 8, 1977, 28774/77
Int. Cl.[2] C23F *13/00*
U.S. Cl. 204—196 21 Claims

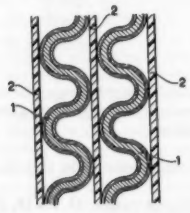


1. An anode component for use in cathodic protection comprising a strip of metal selected from the group consisting of titanium, niobium, hafnium, tantalum and alloys of one or more thereof having anodic properties comparable thereto, said strip having marginal regions and a substantially central longitudinal portion between said marginal regions, said central portion of the strip having a longitudinally extending spine upstanding from the marginal regions of the strip and the spine having a layer of anodically active material thereon.

4,187,165
BIPOLAR ELECTRODE FOR AN ELECTROLYSER

Anthony J. Appleby, Boulogne, and Gilles Crépy, Evry, both of France, assignors to Compagnie Generale d'Electricite, Paris, France

Filed Feb. 1, 1979, Ser. No. 8,444
Claims priority, application France, Feb. 28, 1978, 78 05661
Int. Cl.[2] C25B *11/03, 11/06, 13/04*
U.S. Cl. 204—254 11 Claims



1. A bipolar electrode for an electrolyser having a basic electrolyte, said bipolar electrode including anode and cathode surfaces, the improvement wherein the anode surface and the cathode surface of said electrode both comprise a porous conductive material which includes sintered nickel previously impregnated with nickel molybdate.

4,187,166
METHOD OF REMOVING COPPER IONS FROM A BATH CONTAINING SAME

Wayne A. Kruper, Willowick, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Filed Jan. 22, 1979, Ser. No. 5,602
Int. Cl.[2] C25C *1/12*
U.S. Cl. 204—43 S 8 Claims

1. A process for electrodepositing a covering layer of lead-tin on the surface of a bearing structure formed by co-electrodepositing lead, copper and tin which process comprises

providing a metallic substrate;

placing said metallic substrate in an electroplating bath containing lead ions, tin ions and copper ions,

passing electrical current through said bath to deposit a layer of lead-tin-copper on the surface of said substrate;

removing said so-plated substrate from said bath;

subjecting said so-plated substrate to an aqueous rinsing media to remove electrolyte drag-out from said plating bath from the said plated substrate;

bring said aqueous rinse media into contact with a metal selected from the group consisting of lead, tin and alloys thereof for a period of time sufficient to cause copper ions in said media to be replaced by ions of said metal and said copper ions to deposit on the remained of said metal;

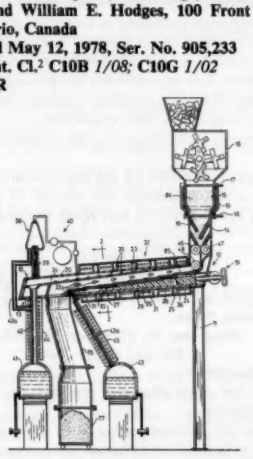
placing said rinsed plated substrate in an electroplating bath which is essentially devoid of copper ions and which contain both lead ions and tin ions; and

passing electrical current through said electroplating bath to deposit a layer of lead-tin on the surface of said substrate.

4,187,167
METHOD AND APPARATUS FOR THE EXTRACTION AND RECOVERY OF HYDROCARBONS FROM PETROLEUM BEARING MATERIALS

Jaroslav Havlik, 695 Bishop St., Cambridge, Ontario, Canada (N3H 4V2), and William E. Hodges, 100 Front St. West, Toronto, Ontario, Canada

Filed May 12, 1978, Ser. No. 905,233
Int. Cl.[2] C10B *1/08;* C10G *1/02*
U.S. Cl. 208—8 R 15 Claims



1. The method of recovering hydrocarbons from solid materials bearing petroleum, comprising the steps of:

(a) depositing the material as a finely divided particulate homogeneous mass on linearly spaced flat reciprocating

transporters housed within a vaporizing chamber having an inlet at one end and a discharge outlet at the other, including the step of metering the material as it is deposited on the transporter;

(b) transporting the deposited material through the vaporizing chamber from the inlet end to the outlet end in direct contact with the reciprocating transporters made from magnetic-electrically susceptible material able to absorb energy from the magnetic component of an electro-magnetic field through the phenomena of electric induction and transform thereby such energy to thermal heat to heat the transporters and thereby heat the said thin layer of material in direct physical contact with the surface of the said transporter to the vaporizing temperature;

(c) heating the transporters by electrical energy to thereby effectively uniformly heat the thin layer of material to the vaporizing temperature of the hydrocarbons during the transportation of the materials therethrough;

(d) controlling the temperature of the transporters the speed of travel of the said material through the vaporizing chamber to vaporize substantially all of the desired hydrocarbons; and

(e) recovering the vaporized hydrocarbons.

4,187,168

HYDROCARBON CONVERSION PROCESSES UTILIZING SUPPORTED HETERONUCLEAR CLUSTER COMPLEX CATALYSTS

Gary B. McVicker, Westfield, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Jul. 13, 1978, Ser. No. 924,198

Int. Cl.[2] C10G *35/08*

U.S. Cl. 208—139 **12 Claims**

1. In a hydrocarbon conversion process wherein a selected hydrocarbon feedstream is contacted with a mixed noble metal catalyst under suitable conditions thereby effecting the desired change in the hydrocarbon, the improvement comprising using as the heteronuclear noble metal catalyst a supported heteronuclear noble metal cluster catalyst prepared by the reduction of supported heteronuclear noble metal cluster complexes which heteronuclear noble metal cluster complexes are selected from the group consisting of:

$(pyridine)_2\ Pt[Ir_6(CO)_{15}]$,

$(pyridine)_2\ Pt[Ir_2(CO)_7]$,

$((C_6H_5)_3P)_2\ Pt[Ir(CO)_3P(C_6H_5)_3]_2$,

$(pyridine)_3\ Pt[Ru_3(CO)_{12}]$,

$((C_6H_5)_3P)_2\ Rh(CO)[Ir(CO)_4]$, and

$(pyridine)_2\ Pt[Rh(CO)_2\ (P(C_6H_5)_3)_2]_2$

and wherein the supports are selected from the group consisting of anhydrous refractory inorganic metal oxides and carbon.

4,187,169

PROCESS AND APPARATUS FOR EFFECTING THREE-PHASE CATALYTIC REACTIONS

Jean-Paul Euzen, Ecully; Daniel Vuillemot, Millery, and Claude Dujardin, Chuzelles, all of France, assignors to Institut Francais du Petrol, Rueil-Malmaison, France

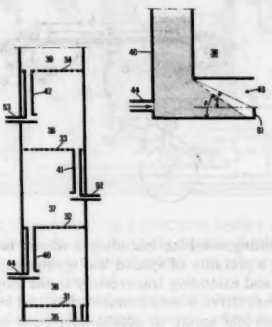
Filed Mar. 10, 1978, Ser. No. 885,222

Claims priority, application France, Mar. 10, 1977, 77 07445; Nov. 4, 1977, 77 33492

Int. Cl.[2] C07C *27/22*; C10G *13/16*; B01J *8/22*

U.S. Cl. 208—157 **12 Claims**

1. A process for reacting a gas with a liquid in the presence of a dispersed solid catalyst, wherein a mixture of said liquid and said gas is circulated upwardly at reaction conditions of said gas with said liquid in general counter-current to the dispersed catalyst throughout a reaction zone comprising a plurality of superposed chambers separated by common walls, each chamber containing a catalyst at least partially dispersed in the circulated liquid, each chamber also communicating with the next upper or lower chamber or both through a number of low section openings giving passage to the liquid and the gas and not to the catalyst under operation conditions, said openings being arranged in the concerned common wall and located on the direct path of the liquid and the gas, and through at least one catalyst transfer duct external to said direct path, the lower portion of the transfer duct forming a relatively quiet zone where the catalyst may accumulate, the liquid and the gas are circulated upwardly in sequence throughout the superposed chambers and the low section openings of the corresponding common walls, fresh catalyst is fed to the upper chamber of the reaction zone, the catalyst particles are moved downwardly from one chamber to a lower chamber through said duct external to the direct path of the



liquid and the gas, catalyst is discharged from the lower chamber of the reaction zone and the liquid reaction product and the residual gas are discharged from the upper chamber, so characterized that the rate of flow of the catalyst from a chamber to the immediately lower chamber is controlled by sweeping along the catalyst accumulated at the bottom of a transfer duct towards said immediately lower chamber by means of an adjustable secondary liquid and/or gas stream injected into said transfer duct, said secondary stream of liquid and/or gas being delivered in the vicinity of the opening at the lower portion of the catalyst transfer duct within said lower chamber, in the direction of said opening.

4,187,170

MAGNETIC TECHNIQUES FOR SEPARATING NON-MAGNETIC MATERIALS

Vernon C. Westcott, Lincoln, and John P. Bowen, South Hamilton, both of Mass., assignors to Foxboro/Trans-Sonics, Inc., Burlington, Mass.

Continuation-in-part of Ser. No. 762,981, Jan. 27, 1977, abandoned. This application Jan. 17, 1978, Ser. No. 870,206

Int. Cl.[2] B03B *1/00*; B03C *1/00*

U.S. Cl. 209—1 **16 Claims**

1. A process for separating a material of interest from a background substance by exposing a mixture thereof to a magnetic field, and wherein said material of interest is essentially non-magnetic and thus by itself not sufficiently responsive to the magnetic field to effect separation from said background substance, the method comprising the steps of:

combining said material with a solution of magnetic atoms to form a composite sample solution; and

transporting said composite sample solution through a magnetic field to develop a force on said material through magnetic influence on the atoms of said solution, said force serving to move said material to a region where it is recoverable from said background substance.

4,187,171

SIFTING MACHINE

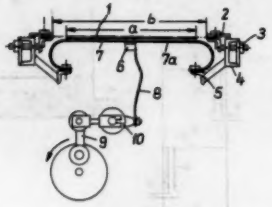
Reinhard Hoffmann; Jurgen Hoffmann, and Norbert Hoffmann, all of Plockhorst, Fed. Rep. of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Fed. Rep. of Germany

Filed Aug. 26, 1975, Ser. No. 607,959

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1974, 2441859

Int. Cl.[2] B07B *1/34, 1/54*

U.S. Cl. 209—383 6 Claims



1. In a sifting machine including a screen having a length dimension; a plurality of spaced leaf springs supported below the screen and extending transversely to the length dimension of the screen; drive means connected to the leaf springs for causing each leaf spring to periodically bend away from the screen and subsequently move rapidly towards the screen to intermittently beat the latter, the improvement wherein the active beating length of each leaf spring is somewhat less than the effective width of said screen; further comprising downwardly resiliently yielding support means for opposite ends of said active beating length of each said leaf spring; said drive means including flexible cables, one associated with each said leaf spring, each cable having a first end attached to the mid portion of the associated leaf spring; and a pulling device attached to a second end of the associated cable for periodically pulling said leaf springs away from said screen for tensioning and then abruptly releasing them for causing them to move, driven solely by their own resiliency, towards and beat against said screen.

4,187,172

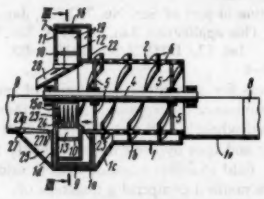
APPARATUS FOR THE SEPARATION OF TRASH FROM LESS HEAVY FIRM ARTICLES IN A FLOW OF LIQUID

Nikolai M. Datsenko, ulitsa Frunze 131, kv. 16; Nikolai N. Pushanko, ulitsa Uritskogo 9, kv. 137, and Vladimir G. Yarmilko, ulitsa Zatonskogo, kv. 78, all of Kiev, U.S.S.R.

Filed Aug. 30, 1978, Ser. No. 937,933

Int. Cl.[2] B07C *3/04*

U.S. Cl. 209—44.3 6 Claims



1. An apparatus for the separation of trash from less heavy firm articles in a flow of liquid comprising: a trough-shaped casing; a source of liquid communicating with said trough-shaped casing; a revolving screen located essentially horizontally in said trough-shaped casing; a drive of said revolving screen to actuate said screen; members to impart motion to trash mounted on said screen; a contrivance for the separation, feeding and discharging of trash located in said trough-shaped casing and attached to said revolving screen at an end where the flow of liquid carrying the uncleaned articles enters said screen and, comprising: an outward cylinder; an inward cylinder of a diameter which is somewhat greater than the diameter of said revolving screen; at least one additional cylinder interposed coaxially between said outward and inward cylinders, ports being provided in said outward cylinder for feeding the outflow of liquid with relatively small trash from said revolving screen into said contrivance, ports being provided in said inward cylinder for feeding the relatively big trash and discharging all the trash separated, ports being provided in said additional cylinder; and partitions along the longitudinal axis of said contrivance between said inward and additional cylinders so that said ports of the inward cylinder and said ports of said additional cylinders are next to each said partition on either side thereof, said partitions serving to accumulate trash thereon; wherein at least three passages are defined between said inward, outward and additional cylinders, said passages extending transversely with respect to the longitudinal axis of said contrivance, each of said passages being provided with a first length defined by the side surfaces of the outward and said additional cylinders and with a second length defined by the side surfaces of said additional cylinder and the inward cylinder, said first length communicating with said second length by a corresponding port of said additional cylinder, each of said passages opening into a corresponding port of said inward cylinder with one of its ends and into a corresponding port of said outward cylinder with another end, each of said passages being of essentially constant cross-sectional area along the entire length, and each of said passages having a length essentially equal to half the circumference of the outward cylinder.

4,187,173

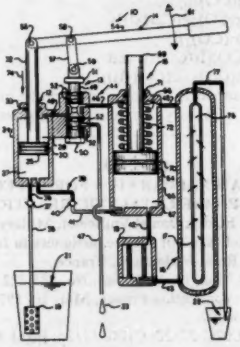
REVERSE OSMOSIS METHOD AND APPARATUS

Bowie G. Keefer, 4324 W. 11th Ave., Vancouver, B. C., Canada (V6R 2M1)

Continuation-in-part of Ser. No. 782,540, Mar. 28, 1977, abandoned. This application Mar. 14, 1978, Ser. No. 886,429

Int. Cl.[2] B01D *13/00*

U.S. Cl. 210—23 H 19 Claims



1. A method of membrane separation of a feed fluid into permeate fluid and concentrate fluid fractions which respectively are permeated and rejected by selective membrane means, the membrane means being exposed to pressurized feed fluid supplied by a reciprocating pump means having a cylinder and piston means and cooperating with valve means in conduit means, the piston means dividing the cylinder into a pumping chamber in which feed fluid is pressurized and an expansion chamber in which the concentrate fluid is depressurized; the method being characterized by steps of:

(a) inducting feed fluid into the pumping chamber by an

induction stroke of the piston and simultaneously exhausting concentrate fluid from the expansion chamber,

(b) reversing direction of force applied to the pump means and simultaneously hydraulically biasing the piston means against movement due to reversal of force so that reaction to reversal of force is transmitted to the valve means causing the valve means to shift in preference to relative piston means movement so as to mechanically shift the valve means to direct fluid flow between the pump means and the membrane means, the transfer of reaction forces causing a dwell period so that the valve means shifts across a closed intermediate position thereof during an interval of substantially zero fluid transfer in the expansion chamber thus incurring timely valve shifting,

(c) pressurizing the feed fluid in the pumping chamber by a compression stroke of the piston means which forces pressurized feed fluid to the membranes, and admitting the concentrate fluid fraction from the membrane means into the expansion chamber to supplement energy supplied to the piston in the compression stroke by using pressure of the concentrate fluid,

(d) separating the feed fluid into a permeate fluid fraction which passes through the membranes, and a concentrate fluid fraction which is returned from the membranes to the expansion chamber to recover some fluid pressure for pressurizing the feed fluid.

4,187,174

DIATOMACEOUS EARTH FILTERAID AND METHOD FOR ITS MANUFACTURE

Richard B. Nielsen, Irvine, and Charles J. Vogelsang, Cerritos, both of Calif., assignors to Grefco, Inc., Bala Cynwyd, Pa.

Continuation of Ser. No. 849,873, Nov. 9, 1977, Pat. No. 4,142,968. This application Dec. 27, 1978, Ser. No. 973,566
The portion of the term of this patent subsequent to Mar. 6, 1996, has been disclaimed.
Int. Cl.² B01D *15/06*
U.S. Cl. 210—32 **22 Claims**

1. A process for producing diatomaceous earth filteraids of reduced beer-soluble iron content comprising the steps of mixing diatomaceous earth filteraids having a beer-soluble iron content of less than about 0.01% with an amount of aqueous acid solution less than about 15% by weight, based on the weight of the dry filteraids, and sufficient, but not in excess, to wet said diatomaceous earth filteraids uniformly, said acid being one which is capable of reducing said beer-soluble iron content within seven days when applied as a 3.0 normal aqueous solution to a diatomaceous earth filteraid in an amount of 15 % by weight based on the weight of the dry filteraid; and maintaining the acid solution in contact with the filteraids for a period of time sufficient to reduce the beer-soluble iron content of said filteraids by at least about 30%.

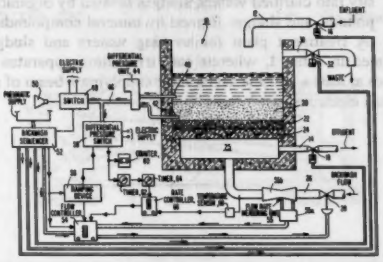
15. A process for producing diatomaceous earth filteraids of reduced beer-soluble iron content comprising the steps of mixing calcined diatomaceous earth filteraids having a beer-soluble iron content of less than about 0.01% with an aqueous acid solution of a strong or moderately strong inorganic acid of concentration of at least 4 gram equivalents of acid per ton of diatomaceous earth filteraid, said aqueous acid solution comprising less than about 15% by weight, based on the weight of the dry filteraids, and in an amount sufficient, but not in excess, to wet said diatomaceous earth filteraids uniformly; and maintaining the acid solution in contact with the filteraids for a period of time sufficient to reduce the beer-soluble iron content of said filteraids by at least about 30%.

4,187,175

TREATMENT FACILITY WITH BACKWASH CONTROL SYSTEM

Charles V. Roberts, Drexel Hill, Pa.; William F. Sarra, Bridgewater, N.J., and Peter J. Neuspiel, Media, Pa., assignors to Robert Filter Manufacturing Company, Darby, Pa.

Filed Jun. 23, 1978, Ser. No. 918,593
Int. Cl.² B01D *23/24*
U.S. Cl. 210—80 **23 Claims**



4. A method of backwashing a treatment facility of the type having a granular media bed for use in treating liquid mixtures, such as industrial and municipal water and wastewater, said method including the steps of:

(a) establishing a first predetermined backwash liquid flow rate responsive to a predetermine pressure condition across the media bed for scouring the bed to release suspended solids or other impurities therefrom, and thereafter;

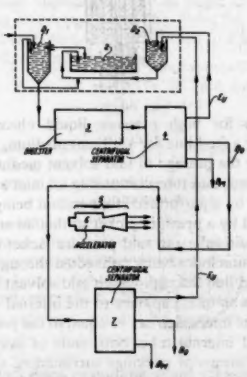
(b) establishing a second and greater backwash liquid flow rate in response to the temperature of the backwash liquid for removing the released impurities from the facility.

4,187,176

HEAVY METAL SEPARATION FROM WASTES EMPLOYING IRRADIATION

Claude Levaillant, Buc, France, assignor to C.G.R. - MeV, Buc, France

Filed Jun. 30, 1978, Ser. No. 921,111
Claims priority, application France, Jul. 5, 1977, 77 20659
Int. Cl.² C02C *1/24*
U.S. Cl. 210—151 **6 Claims**



1. A treatment plant for treating waters and sludges and using a beam of ionising radiation, comprising:

a system for decanting the primary waters and sludges;

a first centrifugal separating system for separating the waters and sludges left after decantation into clarified waters, the sludges formed by organic compounds not containing and

containing heavy metals, and the sludges formed by mineral compounds;

an irradiation apparatus supplying a beam of ionising radiation for irradiating the sludges formed by organic compounds, said organic compounds containing heavy metals being converted by means of said irradiation beam into mineral compounds of greater density;

a second centrifugal separator adapted to receive the irradiated sludges and to separate them according to their density into clarified waters, sludges formed by organic compounds, and sludges formed by mineral compounds.

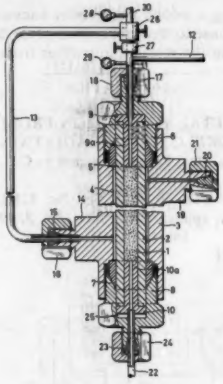
3. A treatment plant for treating waters and sludges as claimed in claim 1, wherein said irradiation apparatus comprises at least a particle accelerator supplying a beam of accelerated electrons.

4,187,177

COLUMN FOR HIGH PRESSURE LIQUID CHROMATOGRAPHY

Kurt-Wilhelm Stahl, Bischofsholer Damm 116, 3000 Hanover 1, Fed. Rep. of Germany

Filed Nov. 3, 1978, Ser. No. 957,517
Int. Cl.² B01D *15/08*
U.S. Cl. 210—198 C **13 Claims**



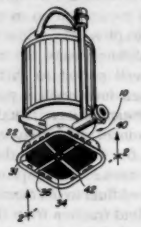
1. A column for high pressure liquid chromatography (HPLC), having a feed line for a solvent medium, a tube filled with sorbent for the passage of said solvent medium and samples to be analysed, said tube comprising an inlet and an outlet end each closed by a perforated stopper, and being concentrically surrounded by a pressure jacket so that an annular interspace between said tube and said pressure jacket is provided, one end of said interspace being connected through a separate line with the feed line through which said solvent is fed under pressure through an inlet capillary to the internal tube so that the pressure in the interspace can be equal to the pressure at the inlet end of said internal tube, both ends of said interspace being sealed by means of packings surrounding said internal tube, venting means connected to the other end of the interspace, and means for adjusting the flow resistance in the inlet capillary of said internal tube, said adjusting means being arranged upstream of the inlet end of said internal tube and downstream of where said separate line connects said interspace with said feed line.

4,187,178

HOLDER FOR FILTER SCREENS

David S. Brown, 3957 W. Lawrence Ave., Chicago, Ill. 60625

Filed Sep. 18, 1978, Ser. No. 942,986
Int. Cl.² B01D *29/00*
U.S. Cl. 210—232 **1 Claim**



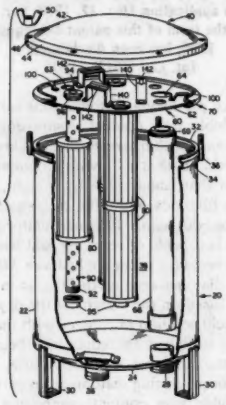
1. A device for removing and replacing a thin filter screen positioned in the lower end of a whirlpool bath apparatus, said apparatus comprising a skirt on its lower end, said skirt having spaced perforations therein, a hollow hub in the lower end of said apparatus, a filter screen, a stem having an enlarged head on one end forming a handle and the other end provided with an enlarged head for seating on said hub, said filter screen supported on said stem between the ends thereof, and ribs anchored to said screen and extending outwardly radially with the ends thereof seated in said perforations.

4,187,179

ELECTRICALLY GROUNDED FILTER PLATE

John F. Harms, 705 Waterway Dr., North Palm Beach, Fla. 33403

Filed Aug. 14, 1978, Ser. No. 933,189
Int. Cl.² B01D *27/08*
U.S. Cl. 210—238 **14 Claims**



1. In a filter having a closed chamber with a removable end wall and a plurality of electrically insulated electrically conductive metal parts relatively movable with respect to each other, wherein one of said metal parts is a removable support for the filter cartridges in said chamber, the improvement comprising: at least one resilient electrically conducting bridging contact means fixedly connected to one of said parts and scratchingly connected to another of said parts, which parts are otherwise electrically insulated with respect to each other, whereby said bridging contact is established when the filter is assembled and said contact is maintained regardless of any

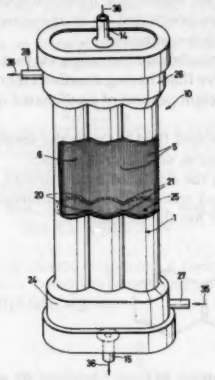
flexing of the parts relative to each other due to positive and negative pressures applied in the chamber during its operation and non-operation.

4,187,180

HOLLOW-FIBER PERMEABILITY APPARATUS

Yasushi Joh, Yokohama, Japan, assignor to Nippon Zeon Co. Ltd., Tokyo, Japan

Filed Oct. 7, 1977, Ser. No. 840,303
Claims priority, application Japan, Oct. 18, 1976, 51-124658
Int. Cl.[2] B01D *31/00*
U.S. Cl. 210—321 R **13 Claims**



1. In a hollow-fiber permeability apparatus in which a permeating region of a housing comprises one compartment containing a bundle of hollow fibers, and wherein materials selectively permeate through the membranes formed by the permeable walls of said hollow fibers with a first fluid flowing along the exteriors of said hollow fibers and a second fluid flowing along the interiors of said hollow fibers, said apparatus comprising means for fixing both end portions of said hollow fibers to said housing, the walls of the housing extending parallel with said fibers between said end portions, and separate inlet and outlet means for introducing and discharging said first and second fluids, the improvement wherein:

(a) at least one housing wall includes at least one portion formed inwardly toward an opposing housing wall to define at least one inwardly formed constriction, the constriction extending in the longitudinal direction of said hollow fibers and extending substantially over the whole length of said permeating region; and

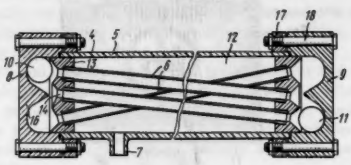
(b) said constriction extending inwardly for a distance short of said opposing housing wall whereby said constriction divides said compartment comprising said permeating region into a plurality of sub-regions with each sub-region communicating with an adjacent sub-region, said permeating region being substantially and uniformly filled with said hollow fibers, the communication of the respective sub-regions resulting in contact between the fibers in one sub-region with the fibers of an adjacent sub-region, said first fluid being adapted to flow freely between sub-regions whereby said constriction operates to divert said first fluid into contact with fibers in the central interior portions of the bundle.

4,187,181

APPARATUS FOR CLASSIFYING LIQUID MIXTURE IN ACCORDANCE WITH MOLECULAR WEIGHT

Anatoly A. Kornilov, ulitsa Moskovskoe shosse, 45, kv. 78, Dolgoprudny; Viktor D. Petrushkin, 3 Novo-Ostankinskaya ulitsa, 23, kv. 49, Moscow; Viktor N. Stetsko, Stremyanny pereulok, 35, kv. 46, Moscow, and Viktor M. Fridman, Karetny ryad, 5/10, kv. 180, Moscow, all of U.S.S.R.

Filed Dec. 28, 1978, Ser. No. 973,870
Int. Cl.[2] B01D *29/30*
U.S. Cl. 210—332 **2 Claims**



1. An apparatus for classifying liquid mixture in accordance with molecular weight, comprising:

a plurality of tubular classifiers connected in series to one another and into a plurality of sections and each said section being parallel connected to a manifold to form a unit of said apparatus; each of said tubular classifiers having a hollow casing;

end plates, each secured to a respective end of the hollow casing of each of said tubular classifiers;

vertically extending transverse partitions, each arranged in the hollow casing of each of said tubular classifiers at the end portions thereof adjacent to said end plates; pipes for admission of liquid mixture, each pipe being tangentially connected to one of the end plates of a respective tubular classifier; pipes for removal of concentrate, each pipe being tangentially connected to the other end plate of said respective tubular classifier; said vertically extending transverse partitions having through holes arranged along a spiral line conjugated with the longitudinal axis of a respective tangentially connected pipe; tubular filtering elements, each having its ends secured in the through holes located at different levels in said vertically extending transverse partitions so that each tubular filtering element is arranged at an angle to the longitudinal axis of said tubular classifier and at an angle to said vertically extending transverse partitions; pipes for removal of filtrate and each pipe being connected to a hollow casing of a respective tubular classifier.

4,187,182

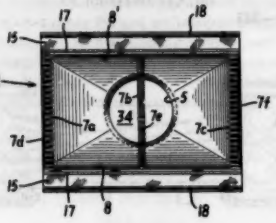
BOX FILTER

David J. Rosenberg, Glen Cove, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Filed Jul. 21, 1978, Ser. No. 926,767
Int. Cl.[2] B01D *27/08*
U.S. Cl. 210—445 **16 Claims**

1. A disposable filter assembly comprising, in combination, a housing in two mating housing portions of a generally box-like configuration having two ends and at least four opposed sides defining therebetween a fluid chamber and at least two fluid ports; having outer side walls along the ends and two opposed sides, and having two sides open, at least two inner side walls spaced from the outer side walls and extending along said opposed sides; a filter element in corrugated sheet form extending across the fluid chamber across the line of fluid flow between the fluid ports and held in a fluid-tight seal extending the length of the inner side walls at opposed side portions of the filter element between an edge of the inner side walls and another portion of the housing; and side caps bonded in a fluid-tight seal to the sides of the filter element extending along

said sides; at least three spaced comb means integral with each housing portion and extending outwardly therefrom, the three comb means being evenly spaced with one comb means at each end and one approximately equidistant from each end of each housing portion, and interdigitatedly inserted between corrugation folds and between each other and having tynes of a width substantially equal to the spacing between corrugation folds, and a length substantially equal to one-half the depth of



the corrugation folds; the comb means, the side caps, and inner side walls and housing portions together holding the sides and corrugation folds of the filter element and positioning the filter element across the fluid chamber, the comb means being so spaced as to support the folds against displacement in any direction, all the side edges of the filter element being sealed to the side caps and inner side walls of the housing, so that the fluid flow between the fluid ports must pass through the filter element.

4,187,183

MIXED-FORM POLYHALIDE RESINS FOR DISINFECTING WATER

Gary L. Hatch, Milwaukee, Wis., assignor to Aqua-Chem, Inc., Milwaukee, Wis.

Continuation of Ser. No. 656,416, Feb. 9, 1976, abandoned, which is a continuation of Ser. No. 563,068, Mar. 28, 1975, abandoned. This application Jun. 29, 1978, Ser. No. 920,260

Int. Cl.[2] C02B *3/06*

U.S. Cl. 210—501 **3 Claims**

1. A mixed-form polyhalide bactericidal resin comprising a strong base anion-exchange resin having anion exchange sites and having attached to a predominant number of such sites polyhalide anions of the following formulas:

$a(I_3^-)$ and $b(I_5^-)$;

wherein:

a=0.4 to 0.8 of the exchange sites;

b=0.1–0.3 of the exchange sites;

$a+b$=a predominant number of the anion sites available for exchange; and

$a+2(b)$ equals or exceeds 1.0.

4,187,184

SOFTENING COMPOSITION

Gert Becker, Weinheim, Fed. Rep. of Germany; Ulrich Schilp, Vlaardingen, Netherlands, and Hans F. Barth, Wiesloch, Fed. Rep. of Germany, assignors to Lever Brothers Company, New York, N.Y.

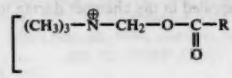
Filed Nov. 16, 1978, Ser. No. 961,273

Claims priority, application United Kingdom, Nov. 16, 1977, 47691/77

Int. Cl.[2] D06M *13/36*

U.S. Cl. 252—8.8 **4 Claims**

1. Fabric-softening agent on the basis of quaternary ammonium compounds, characterized in that it has further a content of choline ester salts of the following formula:



in which R is an alkyl group with 6–24 C atoms and X is a monovalent anion.

4,187,185

OIL RECOVERY PROCESS USING OXYALKYLATED ADDITIVES

Jack H. Park, and Walter D. Hunter, both of Houston, Tex., assignors to Texaco Development Corporation, White Plains, N.Y.

Filed Feb. 13, 1978, Ser. No. 877,152

Int. Cl.[2] E21B *43/24, 43/22;* C11D *3/34*

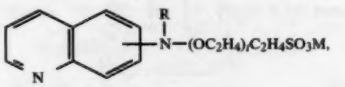
U.S. Cl. 252—8.55 D **9 Claims**

1. A method for recovering hydrocarbons from an underground formation penetrated by an injection well and a production well which comprises:

(a) injecting into the said formation via said injection well an aqueous drive fluid having dissolved therein about 0.05 to about 5.0 weight percent of a sulfonated interfacial tension reducer,

(b) forcing the said fluid through the formation to displace hydrocarbons in said formation, and

(c) recovering the displaced hydrocarbons via said production well, and wherein the said sulfonated interfacial tension reducer has the formula:



wherein t is an integer of from 3 to about 40, and M is selected from the group consisting of hydrogen, sodium, potassium and ammonium, R is selected from the group consisting of hydrogen and $-(OC_2H_4)_sC_2H_4SO_3M$, where s is an integer of from 3 to about 40 and M has the same meaning as previously described.

4,187,186

LUBRICANT COMPOSITIONS CONTAINING ESTERS OF BENZOTRIAZOLECARBOXYLIC ACID

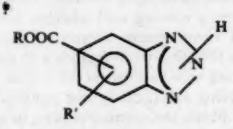
Milton Braid, Westmont, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 12, 1978, Ser. No. 895,677

Int. Cl.[2] C10M *1/32*

U.S. Cl. 252—51.5 R **7 Claims**

1. A lubricant composition which comprises an oleagineous material, and, in an amount effective to impart antiwear, antioxidant and copper corrosion prevention properties thereto, an ester of benzotriazolecarboxylic acid having the formula;



where R is selected from the group consisting of alkyl containing from 1 to 12 carbon atoms, aralkyl containing from 7 to 12 carbon atoms and cycloalkyl and alkyl-substituted cycloalkyl containing from 5 to about 12 carbon atoms; and R' is hydrogen or an alkyl group containing from 1 to 8 carbon atoms.

4,187,187

METHOD AND APPARATUS FOR POLLUTANT SPILL CONTROL

Joseph E. Turbeville, 4303 Jetton, Tampa, Fla. 33609

Division of Ser. No. 792,583, May 2, 1977. This application Nov. 6, 1978, Ser. No. 958,160

Int. Cl.[2] H01F 1/00; B01J 31/02; C02B 1/14

U.S. Cl. 252—62.54 10 Claims

1. In a sorbent for the collection of liquid hydrocarbon pollutants having a partially reticulated, buoyant polymeric plastic substrate, a plurality of non-abrasive, magnetically susceptible particles inbedded in, and substantially evenly distributed throughout said substrate, said particles having a size of from about 100 microns to about 1500 microns, said particles present in an amount sufficient to impart to said sorbent a magnetic force to weight ratio of not less than about 2.0.

4,187,188

ELECTRICAL DEVICE CONTAINING A HALOGENATED ALKANOATE DIELECTRIC FLUID

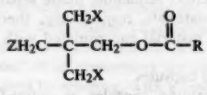
Dennis P. Miller, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 13, 1978, Ser. No. 960,332

Int. Cl.[2] H01B 3/24

U.S. Cl. 252—65 6 Claims

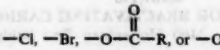
1. In an electrical device containing a dielectric fluid, the improvement which comprises employing as the dielectric fluid a compound of the formula:



where:

X is independently —Cl or —Br;

Z is independently



R and R' are independently $(CH_2)_nCH_3$; and

n is an integer of 0 to 10.

4,187,189

PHASE CHANGE THERMAL STORAGE MATERIALS WITH CRUST FORMING STABILIZERS

Maria Telkes, Killeen, Tex., assignor to American Technological University, Killeen, Tex.

Filed May 2, 1978, Ser. No. 902,239

Int. Cl.[2] C09K 5/06; F24H 7/00

U.S. Cl. 252—70 37 Claims

1. A body for the storage and release of thermal effects, utilizing the heat of fusion of a material forming the body, consisting of

a mass of separate crystalline particles of a salt-hydrate;

a rigid, integral support structure for said mass of particles, formed by a water-insoluble solid filling the voids between said particles and enclosing each particle; said support structure consisting of a crust structure formed by a chemical reaction of a crust-forming compound with the surfaces of said crystalline particles;

said particles and said support structure defining a rigid, self-supporting conglomerate structure; said conglomerate structure remaining rigid and self-supporting for both the solid phase and the liquid phase of said salt-hydrate;

and means providing a water impermeable outer skin for said conglomerate structure.

16. A method for fabricating a heat exchange body, including a heat of fusion material, comprising the steps

preparing a mass of crystalline particles of a salt-hydrate to a generally uniform size;

preparing a crust forming compound, chosen to react chemically with said crystalline particles to form a water insoluble crust surrounding each particle;

thoroughly mixing said salt-hydrate particles and said crust forming compound to form a homogenous mixture;

pouring said mixture into a suitable form;

allowing said mixture to set in said form, whereby said crust forming compound reacts chemically with the surfaces of said particles to form an integral, rigid, water insoluble crust structure surrounding each of said particles and defining an integral, cellular, support structure for said particles;

and forming a moisture impermeable outer skin for said body.

4,187,190

LOW PHOSPHATE CONTENT DISHWASHING DETERGENT

Robert L. McLaughlin, Wilmette, and Donald C. Wood, Des Plaines, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 737,588, Nov. 1, 1976, abandoned. This application Jan. 27, 1978, Ser. No. 872,761

Int. Cl.[2] C11D 7/56

U.S. Cl. 252—99 13 Claims

1. A dry powder, low-phosphate machine dishwashing composition which consists essentially of:

about 10 to about 20 weight percent of a phosphorus-containing compound selected from the group consisting of an alkali metal tripolyphosphate and an alkali metal hexametaphosphate;

at least 8 weight percent of carbonate compounds selected from the group consisting of alkali metal carbonate, bicarbonate or sesquicarbonate, providing a carbonate-to-phosphate weight ratio of about 0.8:1 to about 1.3:1;

a water-soluble alkali metal silicate powder in an amount providing at least about 2.8 weight percent of said composition of soluble SiO_2, the weight ratio of SiO_2/alkali metal oxide in said silicate powder being about 1.8:1 to about 2.6:1; and

at least about 1 up to about 10 weight percent of said composition of a water-soluble high-foaming nonionic surfactant which is an ethoxylated monohydric compound containing at least about 7 moles of ethylene oxide per mol of monohydric compound, and a foam reducing agent therefor.

4,187,191

PHOTORESIST STRIPPER WITH DODECYLSULFONIC ACID AND CHLORINATED SOLVENTS

George W. Simpson, Jr., Cicero, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 26, 1978, Ser. No. 928,094

Int. Cl.[2] C23G 5/02; B08B 3/08

U.S. Cl. 252—143 5 Claims

1. A low cost and readily disposable liquid composition for removing an organic solvent strippable polymer and/or colloid photoresist mask from a face on a silicon wafer substantially at room temperature and pressure, said composition including, by volume, about 15–50% dodecylsulfonic acid, and about 25–42% of each of tetrachloroethylene and orthodichlorobenzene in generally equal stripper proportions.

4,187,192
TALC DISPERSIONS

Geoffrey P. Sheridan, Manchester, Urmston, England, assignor to Lankro Chemicals Ltd., Manchester, England

Filed Feb. 8, 1978, Ser. No. 876,172

Claims priority, application United Kingdom, Feb. 14, 1977, 6084/77

Int. Cl.[2] B01J *13/00*

U.S. Cl. 252—313 R **20 Claims**

1. A stable aqueous talc dispersion containing

(a) at least 60 wt %, based on the total composition, of finely divided talc; and

(b) as a dispersing and wetting agent, at least 0.5 part by weight of one or more sulphated ethoxylated phenol, or alkylated phenol, salt per hundred parts by weight talc, the phenol, or alkylated phenol, salt containing at least 48 wt % ethylene oxide (based on the unsulphated, unsalified phenol, or alkylated phenol, itself), and when alkylated the alkyl group(s) totalling up to 12 carbon atoms.

18. A method for preparing an aqueous talc dispersion which is stable and has a viscosity enabling it to be pumped relatively easily and including at least 60 wt %, based on the total weight of the composition, of finely divided talc comprising: combining said talc, water, and dispersing agent in an amount of at least 0.5 part by weight per hundred parts by weight talc, said amount being sufficient to render said talc dispersed in said water in stable form, said dispersing agent being one or more sulphated ethoxylated phenol, or alkylated phenol, salt containing at least 48 wt % ethylene oxide (based on the unsulphated, unsalified phenol, or alkylated phenol, itself), and when alkylated the alkyl group(s) totaling up to 12 carbon atoms.

4,187,193
MICRO-CAPSULES CONTAINING UREIDO FLUORAN CHROMOGENIC COMPOUNDS

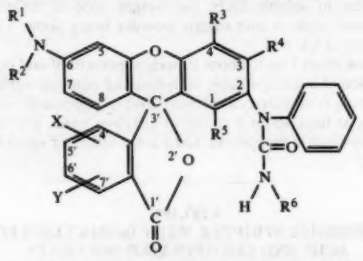
David N. Vincent, San Diego, Calif., and Cheng-Hsiung Chang, Naperville, Ill., assignors to Champion International Corporation, Stamford, Conn.

Division of Ser. No. 611,205, Sep. 8, 1975, Pat. No. 4,104,437, and a continuation-in-part of Ser. No. 508,834, Sep. 24, 1974, abandoned. This application May 5, 1978, Ser. No. 903,134

int. Cl.[2] B01J *13/02*

U.S. Cl. 252—316 **11 Claims**

1. Pressure-rupturable microcapsules containing a chromogenic compound having the structural formula



wherein

R^1 and R^2 each represent an alkyl group;

R^3 and R^4 each represent a hydrogen atom; a halogen atom, an alkyl group, a nitro group, an amino group, an acyl group, or a carboalkoxy group;

R^5 represents a hydrogen atom or an alkyl group, with the proviso that R^5 represents an alkyl group only when R^4 represents a hydrogen atom;

R^6 represents an alkyl group, an aryl group or an aralkyl group; and

X and Y each represent a hydrogen atom, a halogen atom, a nitro group, a lower alkyl group, an aryl group, an alkoxy group, or a carboalkoxy group.

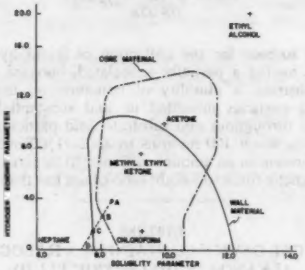
4,187,194
ENCAPSULATION PROCESS

Russel E. Wellman, Pittsford, and Robert W. Brown, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 214,744, Jan. 3, 1972, abandoned. This application Feb. 7, 1974, Ser. No. 440,637

Int. Cl.[2] B01J *13/02;* **B05D** *7/00;* **B29C** *13/00*

U.S. Cl. 252—316 **18 Claims**



1. Process for forming capsules comprising

(i) forming a solution of wall material and core material in a solvent;

(ii) admixing said solution with an immiscible liquid to form a dispersion wherein said solution is the dispersed phase and the immiscible liquid is the continuous phase;

(iii) altering the solubility characteristics of the solvent for said solution to effect sequential phase separation of said core and wall materials, respectively, thereby forming capsules of core material encapsulated with wall materials; and

(iv) recovering said capsules.

18. Process for forming capsules as defined in claim 1 wherein the capsule exhibits an average particle size ranging from 1 to about 100 microns.

4,187,195
METHOD FOR REACTIVATING CARBON

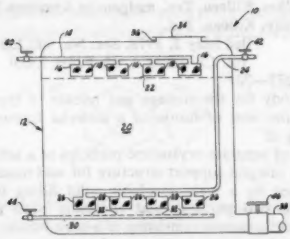
Sterling R. Kennedy, 3460 Hollenberg Dr., Bridgeton, Mo. 63044

Continuation-in-part of Ser. No. 509,353, Sep. 25, 1974, Pat. No. 3,965,037. This application Mar. 17, 1976, Ser. No. 667,481

The portion of the term of this patent subsequent to Jun. 22, 1993, has been disclaimed.

Int. Cl.[2] B01J *21/20;* **B01D** *15/06*

U.S. Cl. 252—412 **6 Claims**



1. The method of reactivating in place carbon in a carbon

bed which has been used in filtering water reclaimed from industrial wastes and is contaminated with industrial waste components which consists in removing from the carbon excess water but discontinuing such removal before the water level reaches the level of the bed, adding a hydroxide of an alkali metal to said carbon, mixing the water remaining with the hydroxide to thoroughly mix the hydroxide with the carbon, wherein high pressure air is periodically blown into the hydroxide and water to thoroughly mix the hydroxide with the carbon, periodically repeating said mixing while retaining the mixture of hydroxide and water with the carbon for sufficient time to reactivate the carbon, and then removing the hydroxide and water from the carbon.

4,187,196

PROCESS FOR THE STEREOREGULAR POLYMERIZATION OF ALPHA-OLEFINS

Umberto Giannini; Antonio Cassata; Paolo Longi, all of Milan, and Romano Mazzocchi, Pernate, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Continuation of Ser. No. 795,363, May 9, 1977, abandoned, which is a continuation-in-part of Ser. No. 503,766, Sep. 6, 1974, abandoned, which is a continuation of Ser. No. 265,455, Jun. 23, 1972, abandoned. This application Oct. 30, 1978, Ser. No. 955,762

Claims priority, application Italy, Jun. 25, 1971, 26275 A/71

Int. Cl.[2] C08F *4/02, 10/06*

U.S. Cl. 252—429 B **9 Claims**

1. Process for preparing a component of catalysts for the stereoregular polymerization of alpha-olefins of the formula CH_2=CHR in which R is an alkyl radical having from 1 to 6 carbon atoms, which process comprises contacting a halogenated bi-, tri-, or tetra-valent Ti compound, or a complex of said Ti compounds and an electron-donor compound, with a support formed of or comprising an anhydrous Mg or Mn dihalide obtained by reacting, with a trialkyl Al compound, a complex of the Mg or Mn dihalide and an electron-donor compound, selected from the group consisting of esters of oxygenated organic or inorganic acids, the Al trialkyl/ester molar ratio being higher than 1.0.

4,187,197

CATALYST FOR THE DIMERIZATION OF OLEFINS

Viktor A. Kabanov, Lomonosovsky prospect, 14, kv. 108; Marina A. Martynova, ulitsa Stasovoi, 4, kv. 34; Stanislav K. Pluzhnov, pereulok Yazykovsky, 5, kv. 104, and Vladimir I. Smetanjuk, ulitsa Stasovoi, 4, kv. 34, all of Moscow, U.S.S.R.

Division of Ser. No. 779,263, Mar. 18, 1977, Pat. No. 4,118,432. This application Apr. 11, 1978, Ser. No. 895,341

Int. Cl.[2] B01J *31/22, 31/24*

U.S. Cl. 252—431 P **3 Claims**

1. In a dimerization catalyst consisting of a complex of a nickel salt with a compound selected from the group consisting of tertiary phosphines and tertiary phosphites in combination with an organoaluminum compound wherein the improvement comprises using as the organoaluminum compound a rubber selected from the group consisting of natural and synthetic carbo-chain rubber with a content of 2 to 50 mol% of AlRX units, wherein R is an alkyl with at most 8 carbon atoms, X is a halogen; the atomic ratio of Al/Ni being varied within the range of from 1:1 to 100:1.

4,187,198

NOVEL PRECIOUS METAL SENSITIZING SOLUTIONS

Rudolph J. Zeblisky, Hauppauge, N.Y., assignor to Kollmorgen Technologies Corp., Dallas, Tex.

Continuation of Ser. No. 869,237, Jan. 13, 1978, which is a continuation of Ser. No. 639,440, Dec. 10, 1975, abandoned, which is a continuation of Ser. No. 531,724, Dec. 11, 1974, Pat. No. 3,960,573, which is a continuation of Ser. No. 278,429, Aug. 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 9,060, Feb. 5, 1970, abandoned, which is a continuation-in-part of Ser. No. 801,167, Feb. 20, 1969, Pat. No. 3,672,938, which is a continuation-in-part of Ser. No. 712,575, Mar. 12, 1968, abandoned, which is a continuation of Ser. No. 551,249, May 19, 1966, abandoned, which is a continuation of Ser. No. 285,889, Jun. 6, 1963, abandoned, which is a continuation of Ser. No. 53,352, Sep. 1, 1960, abandoned. This application Apr. 24, 1978, Ser. No. 898,805

The portion of the term of this patent subsequent to Jun. 27, 1989, has been disclaimed.

Int. Cl.[2] B01J *27/08, 27/10*

U.S. Cl. 252—434 **10 Claims**

1. A process for the formation of an essentially dry composition which, upon admixture with an aqueous solution containing about 12 to 18.5% hydrochloric acid, forms a stable catalyst solution for catalyzing a substrate prior to deposition of an electroless metal, said process comprising the steps of providing a liquid catalyst solution that is the product of admixture in hydrochloric acid of a catalytic metal halide with a stannous halide in molar excess of the catalytic metal halide, said liquid catalyst composition comprising acid in an amount sufficient to prevent hydrolysis; drying said liquid catalyst composition; and mixing stannous halide with the product obtained by drying said liquid catalyst composition to protect against the effects of atmospheric oxidation, said stannous halide being added in excess.

4,187,199

HYDROCARBON CONVERSION CATALYST

Sigmund M. Csicsery, Lafayette, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 772,170, Feb. 25, 1977, Pat. No. 4,137,151. This application Sep. 5, 1978, Ser. No. 939,578

Int. Cl.[2] B01J *29/06*

U.S. Cl. 252—455 Z **5 Claims**

1. A catalyst composition comprising 1 to 80 weight percent of a zeolitic crystalline aluminosilicate, 0.05 to 10 weight percent lanthanum, calculated as the elemental metal and excluding lanthanum in the crystal structure of said aluminosilicate, and 0.05 to 10 weight percent iron, calculated as the elemental metal and excluding iron in the crystal structure of said zeolite, said lanthanum, iron and aluminosilicate being dispersed in a porous, refractory matrix.

4,187,200

METHOD OF MAKING A SUPPORTED POROUS METAL CATALYST

William C. Jenkin, 382 Dorchester Rd., Akron, Ohio 44320

Filed Jun. 20, 1978, Ser. No. 917,278

Int. Cl.[2] B01J *23/74, 35/00*

U.S. Cl. 252—472 **10 Claims**

1. The method of making a highly active metal catalyst, which method comprises producing a coating of an alloy on a supporting surface, the alloy containing a first metal having catalytic properties, and a second metal capable of forming a volatile compound, reacting the coating with a material forming a volatile compound with the second metal, and removing the compound by volatilization.

4,187,201

THICK FILM CONDUCTORS

David G. Hilson, Norwalk, Conn., and Peter A. Tulipan, Irvington, N.Y., assignors to Electro Materials Corporation of America, Mamaroneck, N.Y.

Filed Mar. 15, 1978, Ser. No. 886,945
Int. Cl.[2] H01B 1/02
U.S. Cl. 252—512 15 Claims

1. A conductor paste comprising: a conductive metal consisting essentially of one member of the group consisting of Cu, Au, Au combined with Pt and Pd, Ag combined with Pd, and Ag combined with Pd and Pt; a vehicle; and a flux, said flux including ZnO in an amount equal to about 1% to 3% by weight of the total.

4,187,202

PROCESS FOR PREPARING POLYMER RESINS OF HIGH IMPACT RESISTANCE

Masatsune Kondo, and Akira Tanoue, both of Niihama, Japan, assignors to Sumitomo Chemical Company, Osaka, Japan

Filed Jul. 28, 1976, Ser. No. 709,515
Claims priority, application Japan, Jul. 30, 1975, 50-93577
Int. Cl.[2] C08F 253/00; C08C 1/14; C08F 255/00
U.S. Cl. 260—4 R 6 Claims

1. A process for preparing polymer resins of high impact resistance which comprises coagulating a latex of a rubbery polymer selected from the group consisting of natural rubber, butadiene rubber, styrene-butadiene copolymer, acrylonitrile-butadiene copolymer, isoprene rubber, chloroprene rubber, acrylic rubber, ethylene-propylene-diene terpolymer and ethylene-vinyl acetate copolymer, said rubbery polymer being grafted or not with at least one ethylenic monomer in the presence of a suspension stabilizer and a coagulating agent to make a stable aqueous suspension of coagulated particles of said rubbery polymer, adding at least one ethylenic monomer to the aqueous suspension and subjecting the resultant mixture to suspension polymerization, said resins having a rubbery polymer content of 3 to 60% by weight.

4,187,203

POLYAMINE-CHROMIC ACID IONIC POLYMERS AND AQUEOUS CATIONIC ELECTROCOAT SYSTEMS CONTAINING THE SAME

Edward J. Murphy, Mt. Prospect, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.

Filed Jul. 14, 1978, Ser. No. 924,569
Int. Cl.[2] C09D 5/08, 5/40
U.S. Cl. 260—18 N 8 Claims

1. An aqueous cationic electrocoating bath adapted to electrodeposit films at the cathode which cure to provide enhanced corrosion protection, comprising an aqueous bath having an amine-functional resin dispersed therein with the aid of a solubilizing acid, and a polyamine-chromic acid ionic polymer formed by mixing a water insoluble polyamine with from about 50 to about 95 equivalent percent of aqueous chromic acid, said ionic polymer providing from about 25 to about 1000 parts of chromate per million of said bath.

4,187,204

WATER-RESTRICTED, WATER-SOLUBLE PAINT

Jerald D. Howard, Upland, Calif., assignor to Pactra Industries, Inc., Los Angeles, Calif.

Division of Ser. No. 807,109, Jun. 16, 1977, Pat. No. 4,125,499. This application May 16, 1978, Ser. No. 906,386
Int. Cl.[2] C09D 3/58, 3/64, 3/74, 5/02
U.S. Cl. 260—22 CB 22 Claims

1. A water soluble paint composition capable of direct application to a surface for forming a dried coating of paint, comprising:

from 5 to 60 weight percent of a water soluble, neutralized resin film former obtained by reaction of (a) resin containing sufficient carboxyl groups to be water solubilized by reaction with a basic neutralizer to form a salt thereof, said resin being selected from maleinized oils, oil modified alkyds, copolymer alkyds, oil free alkyds, acrylic solutions, copolymer oils, epoxy esters and urethane polymers, and (b) an amine or ammonia as said basic neutralizer for forming said salt with said resin, the amount of said neutralizer reacted with said resin to water-solubilize said resin being equal to at least 60% of the theoretical neutralization requirement of said resin; and

from 35 to 95 weight percent of a solvent for said neutralized resin comprising a water-soluble solvent;

said paint composition having a maximum of 8 weight percent water.

4,187,205

RADIATION-SENSITIVE COMPOSITION

Yoshio Hatano, Hachioji; Saburo Nonogaki, Tokyo; Shinkichi Horigome, Tachikawa, and Shungo Sugawara, Mito, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation and Hitachi, Ltd., both of, Japan

Filed Feb. 15, 1978, Ser. No. 877,866
Claims priority, application Japan, Feb. 18, 1977, 52/16232
Int. Cl.[2] 260 45.9 D; C08K 5/34, 5/13, 5/08
U.S. Cl. 260—30.4 A 4 Claims

1. A radiation-sensitive composition comprising a radiation-sensitive polymer which contains a plurality of epoxy groups and a plurality of bromine atoms in one molecule thereof and which comprises at least one polymeric material selected from the group consisting of brominated and epoxidized homopolymers of butadiene, brominated and epoxidized copolymers of butadiene, brominated and epoxidized homopolymers of isoprene, brominated and epoxidized copolymers of isoprene, brominated products of copolymers of butadiene with addition-polymerizable compounds containing an epoxy group, brominated products of copolymers of isoprene with addition-polymerizable compounds containing an epoxy group and epoxidized products of copolymers of one of butadiene and isoprene with addition-polymerizable compounds containing a bromine atom, and at least one stabilizer which is selected from the group consisting of compounds having stable free radicals selected from the group consisting of 2,2-diphenyl-1-picrylhydrazyl and α,γ-bisdiphenylene-β-phenylallyl, polymerization inhibitors selected from the group consisting of hydroquinone monomethyl ether, benzoquinone, methylquinone, 2,5-dimethylquinone, thymoquinone, trimethylquinone, tetramethylquinone, chloranil, 1,4-naphthoquinone, phenanthraquinone, chrysenequinone, 2-methoxyquinone, 2-chlorobenzoquinone, dichlorobenzoquinone, methylnaphthoquinone, dichloronaphthoquinone, anthraquinone, and 2-tert-butylanthraquinone, ketone-amine reaction products selected from the group consisting of polymerization products of 2,2,4-trimethyl-1,2-dihydroquinoline, 6-ethoxy-2,2,4-trimethyl-1,2-dihydroquinoline and 6-dodecyl-2,2,4-trimethyl-1,2-dihydroquinoline and phenol derivatives selected from the group consisting of 4,4′-dioxydiphenyl, dioxydiphenyl methane derivatives, and 1,1-bis-(4-hydroxyphenyl)-cyclohexane.

4. A radiation-sensitive composition according to claim 1, further comprising a solvent in which the radiation-sensitive polymer is dissolved in the non-crosslinked or non-irradiated state.

4,187,206

BLEND COMPOSITION OF AN OIL AND A NEUTRALIZED SULFONATED ELASTOMERIC POLYMER

Douglas Brenner, Livingston, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Nov. 29, 1977, Ser. No. 855,774
Int. Cl.[2] C08L 91/00
U.S. Cl. 260—23.5 A 26 Claims

1. An elastomeric blend composition which is injection moldable or extrudable comprising:

(a) a neutralized sulfonated elastomeric polymer having about 15 to about 50 meq. of metal sulfonate groups per

100 grams of said neutralized sulfonated elastomeric polymer, said metal sulfonate containing an ammonium or metal counterion; and

(b) about 10 to about 200 parts by weight of a non-polar process oil per 100 parts of said neutralized sulfonated elastomeric polymer, said non-polar process oil having less than 0.75 wt.% polar type compounds as measured by molecular type clay gel analysis and less than 10 wt.% aromatic constituents.

4,187,207

FLAMEPROOFED POLYAMIDE CONTAINING RED PHOSPHOROUS

Jacqueline Cerny, Lyons, and Robert Troncy, Oullins, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Oct. 11, 1977, Ser. No. 840,634

Claims priority, application France, Oct. 11, 1976, 76 31308

Int. Cl.[2] C08K *3/40*

U.S. Cl. 260—37 N **6 Claims**

1. A composition of matter comprising a polyamide, an amount of red phosphorous sufficient to flameproof said polyamide and an amount of cadmium oxide sufficient to retard the liberation of phosphine during heating of said polyamide.

4,187,208

COLORED ORGANOSILOXANE ELASTOMERS WITH IMPROVED FLAME RETARDANCY

Hewart W. Winnan, South Glamorgan, Wales, assignor to Dow Corning Limited, Barry, Wales

Filed Mar. 30, 1978, Ser. No. 891,588

Claims priority, application United Kingdom, Mar. 31, 1977, 13595/77

Int. Cl.[2] C08L *83/04*

U.S. Cl. 260—37 SB **5 Claims**

1. A method for improving the flame resistance of a colored organosiloxane elastomer containing a platinum flame retarding agent wherein the elastomer is a composition vulcanizable to a silicone rubber containing:

(A) a polydiorganosiloxane convertible to the solid elastic state, wherein the organic substituents are selected from monovalent hydrocarbon groups and monovalent fluorinated hydrocarbon groups, at least 40 percent of the total substituents being methyl groups, any groups having aliphatic unsaturation being present in a proportion of not greater than 2 percent, the ratio of organic substituents to silicon atoms in the polydiorganosiloxane being in the range from 1.98 to 2.02,

(B) a reinforcing silica filler

(C) an organic peroxide vulcanising agent and

(D) from 2 to 150 parts by weight of platinum per million parts by weight of (A), the improvement consisting essentially of the addition of from 0.01 to 10 parts by weight per 100 weight of (A) of a pyrazolone pigment to the elastomer composition.

4,187,209

BRAKE BLOCK MATERIAL

William H. Searfoss, and Gerald P. Jones, both of Ridgway, Pa., assignors to Molded Materials Company, Div. Carlisle Corporation, Ridgway, Pa.

Continuation-in-part of Ser. No. 904,613, May 10, 1978. This application Nov. 6, 1978, Ser. No. 957,864

The portion of the term of this patent subsequent to Apr. 17, 1979, has been disclaimed.

Int. Cl.[2] C08K *3/22, 3/30, 3/32*

U.S. Cl. 260—38 **6 Claims**

1. An improved heat and wear resistant friction material comprising in approximate percent by weight:

Spun blast furnace slag fibers: 20%–75%

Phenolic Resin and Modifier: 13%–33%

Barytes: 10%–35%.

4,187,210

HOMOGENEOUS, HIGHLY-FILLED, POLYOLEFIN COMPOSITES

Edward G. Howard, Jr., Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 573,598, Apr. 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 424,820, Dec. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 424,821, Dec. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 424,822, Dec. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 444,295, Feb. 21, 1974, abandoned, which is a continuation-in-part of Ser. No. 529,006, Dec. 2, 1974, abandoned. This application Jun. 25, 1976, Ser. No. 699,942

Int. Cl.[2] C08K *9/00*

U.S. Cl. 260—42.14 **66 Claims**

1. A solid, homogeneous, particulate, highly-filled, polyolefin composite which comprises

(a) 10–75% by weight of polyolefin having an inherent viscosity of at least 2 selected from the group consisting of polyethylene and copolymers of ethylene containing up to 15% by weight of units derived from one or more 1-alkenes of 3 to 10 carbon atoms, and

(b) 25–90% by weight of finely-divided, inorganic filler compound having a neutral-to-acidic surface and a weight-average average equivalent spherical particle diameter of 0.1 to less than 50μ, and having interacted at its surface sufficient catalytically-active transition metal compound which contains substantially no halogen bonded to the transition metal to provide 0.000001–1.7 milligram-atom of transition metal per gram of filler,

said polyolefin being polymerized onto the surface of said filler, and said composite being substantially free of polymer-free filler and filler-free polymer, being a free-flowing powder, having particle sizes in the range of 0.1μ to 5 mm, and having a 10-second micronization homogeneity of at least 50% and a micronization homogeneity index of at least 20.

4,187,211

FORMULATION AND MANUFACTURE OF ANTIFOULING COMPOSITIONS

Alan V. Robinson, and John Chapman, both of Tyne and Wear, England, assignors to Camrex Research and Development, Ltd., Sunderland, England

Filed Mar. 20, 1978, Ser. No. 888,592

Claims priority, application United Kingdom, Mar. 21, 1977, 11900/77

Int. Cl.[2] C08K *5/57*

U.S. Cl. 260—42.44 **11 Claims**

1. In an antifouling marine coating composition comprising a cuprous oxide pigment and a triorganotin compound selected from the group consisting of triorganotin carboxylate homopolymers and triorganotin carboxylate copolymers, the cuprous oxide pigment and the triorganotin compound co-acting to provide an extremely effective coating toxic to marine life, the improvement comprising the presence of a desiccant for increasing the storage life of the composition, the desiccants being relatively inert and of low water solubility and capable of taking up water either physically or chemically, the desiccant being present in the coating composition in an amount sufficient to keep the cuprous oxide pigment and triorganotin compound relatively free of moisture.

4,187,212

STABILIZATION SYSTEMS FROM TRIARYLPHOSPHITES AND PHENOLS

Horst Zinke, Ernsthofen; Hans J. Lorenz, Bensheim-Auerbach, both of Fed. Rep. of Germany, and Helmut Linhart, Reinach, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 658,312, Feb. 17, 1976, abandoned. This application Jun. 2, 1977, Ser. No. 802,921

Claims priority, application Switzerland, Feb. 20, 1975, 2155/75; Sep. 19, 1975, 12231/75

Int. Cl.[2] C08K *5/52*

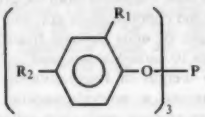
U.S. Cl. 260—45.8 NT **20 Claims**

1. A stabilized composition consisting essentially of

(a) a polymer that is derived from a singly unsaturated acyclic hydrocarbon, or mixtures or copolymers thereof and

(b) from 0.005 to 5% of a mixture of

(1) a triarylphosphite of the general formula



wherein

R_1 represents tert-butyl, or 1,1-dimethylpropyl,

R_2 represents methyl, tert-butyl, or 1,1-dimethylpropyl, and

(2) a hindered phenolic antioxidant selected from the group consisting of 1,3,5-tris-(3′,5′-di-t.butyl-4-hydroxybenzyl)-isocyanurate, 1,3,5-tris-(3,5-di-t.butyl-4-hydroxybenzyl)-2,4,6-trimethylbenzene, ethyleneglycol-bis(3,3-bis-3′-t.butyl-4′-hydroxyphenyl)-butyrate, pentaerylthrit-tetra-[3-(3,5-di-t.butyl-4-hydroxyphenyl)-propionate], thiobisethyleneglycol-bis-[3-(3,5-di-t.butyl-4-hydroxyphenyl)-propionate], hexamethylene-1,6-di-[3-(3,5-di-t.butyl-4-hydroxyphenyl)-propionate] and β-(3,5-di-t.butyl-4-hydroxyphenyl)-propionic acid-n-octadecyl ester, the ratio of the phosphite to the antioxidant being from 10:1 to 1:5.

4,187,213

MULTIHETEROCYCLIC ULTRAVIOLET STABILIZERS AND THEIR USE IN ORGANIC COMPOSITIONS

Gether Irick, Jr.; James C. Ownby, and Richard H. S. Wang, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

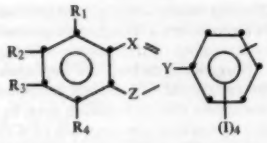
Filed Jan. 9, 1978, Ser. No. 868,087

Int. Cl.[2] C07D *213/28, 213/36, 213/89;* C08K *5/35*

U.S. Cl. 252—402 **26 Claims**

14. An organic composition susceptible to ultraviolet light degradation stabilized against such degradation with a stabilizing amount of at least one novel multiheterocyclic compound having the formula:

wherein A is a group having the structure



wherein

X is a carbon atom or a nitrogen atom;

Y is a carbon atom;

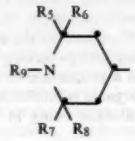
Z is an oxygen atom, a sulfur atom, or a nitrogen atom containing a hydrogen atom or an alkyl group having 1 to 12 carbon atoms or an aryl or substituted aryl group having 6 to 18 carbon atoms;

R_1, R_2, R_3 and R_4 are hydrogen, hydroxyl, chloro, bromo, lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, lower alkylaryl, aryl-substituted-aryl, alkoxy, amino, substituted amino, cyano or carboxy and the substituents R_1 and R_2, R_2 and R_3, and R_3 and R_4, combined with the carbon atoms to which they are attached, are joined alkylene groups completing a carbocyclic ring, which ring can also be substituted with one or more of the substituents listed above for R_1, R_2, R_3 and R_4;

I is the same as R_1, R_2, R_3 and R_4 and is present on all positions of the benzenoid ring, except the carbon atom attached to Y and the carbon atom attached to the B group connecting the heterocyclic A group with the C group, said B connecting group being attached to the benzenoid ring in the ortho, meta or para positions from the carbon atom connected to Y, said I substituents can all be the same substituent listed above or different listed substituents;

wherein B is a linking group connecting A and C and can be alkylene, arylene, carbonyloxy, oxycarbonylalkyleneoxy, oxycarbonyl, alkyleneoxycarbonyloxy, oxyalkylenecarbonyl, oxycarbonyloxy, alkyleneoxy, oxyalkylene, alkyleneoxyalkyleneoxy, thio, thioalkyleneoxy, sulfinylidioxy, oxy(alkoxy)phosphinooxy, alkyloxyphosphinylidene, aryloxyphosphinylidene, oxy(alkyl)phosphinyloxy, aminocarbonyl, N-alkylaminocarbonyl, N-arylaminocarbonyl, aminocarbonylalkyleneoxy, N-alkylaminocarbonylalkyleneoxy, N-arylaminocarbonylalkyleneoxy, aminocarbonylamino, N-alkylaminocarbonylamino, N,N-dialkylaminocarbonyl, N-arylaminocarbonyl, N-alkylaminocarbonyl, N,N-diarylaminocarbonyl, amino, N-alkylamino, N-arylamino, N-alkylaminoalkyleneoxy, N-arylaminoalkyleneoxy, oxyalkyleneoxy, oxyaryleneoxy, alkyleneaminoalkylene, aryleneaminoarylene, aryleneaminoalkylene and alkyleneaminoarylene; and

wherein C is a group having the formula



R_5 and R_6 are each alkyl having 1–6 carbons; R_7 and R_8 are each alkyl having 1–6 carbons or together with the carbon to which they are bound form a cyclopentyl or cyclohexyl ring, which is unsubstituted or substituted with a methyl group; and R_9 is hydrogen, oxy, alkyl having 1 to 12 carbon atoms, β-methoxyethyl, alkenyl having 3 or 4 carbon atoms, propargyl, benzyl or alkyl substituted benzyl.

4,187,214

FIRE RETARDANT ADHESIVE POLYOLEFIN COMPOSITIONS

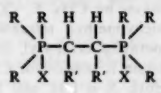
Donald G. Needham, and Ray D. Griffin, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 412,282, Nov. 2, 1973, Pat. No. 3,940,547. This application Dec. 12, 1975, Ser. No. 640,087

Int. Cl.[2] C08K *5/16*

U.S. Cl. 260—45.9 KA **9 Claims**

1. A fire retardant composition having improved adhesion to aluminum, said composition comprising a normally solid, thermoplastic polyolefin; a crosslinking agent; a halogenated phosphorus-nitrogen compound having the formula



wherein R′ is H or an alkyl radical having from 1 to 3 carbon atoms, R is a cyano alkyl radical having from 2 to 6 carbon atoms and X is chlorine, bromine, or iodine; ammonium polyphosphate having at least 45 percent of the phosphate in the form of polyphosphates; and a dimer of hexachlorocyclopentadiene wherein the concentrations of each of said halogenated phosphorus-nitrogen compound and said ammonium polyphosphate are in the range of about 2 percent to about 7.5 percent based on the weight of said polyolefin, and wherein the concentration of hexachlorocyclopentadiene dimer is within the range of about 5 percent to about 20 percent by weight based on the weight of said polyolefin.

4,187,215

POLYMERIC ISOCYANATE-HYDROXY TERMINATED POLYBUTADIENE COMPOSITIONS

John M. Wrightson, Carmichael, Calif., assignor to Aerojet-General Corporation, El Monte, Calif.

Filed Sep. 25, 1972, Ser. No. 292,195
Int. Cl.[2] C08F *18/24*
U.S. Cl. 528—51 **12 Claims**

1. A composition comprising in combination:
organic compounds containing a plurality of hydroxyl groups capable of reacting with an isocyanato group;
polyisocyanate of the general formula $R(NCO)_m$ in which R is a di-or polyvalent organic radical containing from 2–30 carbon atoms and m is 2,3, or 4;
homopolymerizable polyisocyanate in excess of the stoichiometric amount necessary to form said polyurethane; and
a catalyst in an amount effective for said homopolymerization.

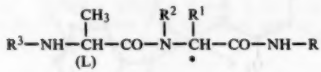
4,187,216

DIPEPTIDE DERIVATIVES

Cedric H. Hassall, Welwyn; William H. Johnson, Hitchin, and Noel A. Roberts, Welwyn Garden City, all of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Jun. 8, 1977, Ser. No. 804,680
Claims priority, application United Kingdom, Jun. 25, 1976, 26662/76; Aug. 6, 1976, 32847/76; Mar. 14, 1977, 10657/77
Int. Cl.[2] C07C *103/52;* C07G *7/00*
U.S. Cl. 260—112.5 R **34 Claims**

1. Dipeptide derivatives of the formula



(I)

wherein R is phenyl, substituted phenyl, lower cycloalkyl or n-(C_4-C_6)-alkyl; R^1 and R^2 each is hydrogen or methyl, with the proviso that R^1 and R^2 are not simultaneously hydrogen, or R^1 and R^2 together are trimethylene; R^3 is alkanoyl, haloalkanoyl, nitro-alkanoyl, cyano-alkanoyl, cycloalkylcarbonyl, cycloalkyl-alkanoyl, aroyl, aryl-alkanoyl, alkoxycarbonyl, aryloxycarbonyl, arylsulfonyl, alkylsulfonyl, cyclo-alkylsulfonyl, cycloalkylsulfinyl, cycloalkyl-alkylsulfonyl or cycloalkyl-alkylsulfinyl and the asterisk denotes that the configuration at the carbon atom so-marked is L when R^1 is other than hydrogen.

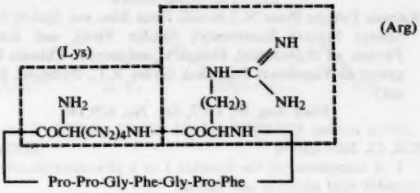
4,187,217

BRADYKININ CYCLIC ANALOG-CYCLO-[(N^{ϵ}-1-L-LYSINE, 6-GLYCINE)-BRADYKININ]

Gunar I. Chipens, ulitsa Lenina, 84, kv. 5; Felix K. Mutulis, ulitsa Bikrnieku, 77, kv. 52, and Inta P. Misinya, ulitsa St. Mangali, 7, kv. 1, all of Riga, U.S.S.R.

Filed Dec. 8, 1978, Ser. No. 967,609
Claims priority, application U.S.S.R., Dec. 14, 1977, 2555261
Int. Cl.[2] C07C *103/52;* C07G *7/00*
U.S. Cl. 260—112.5 R **1 Claim**

1. Cyclic analog of bradykinin - cyclo[(N^{-68} -1-L-lysine, 6-glycine)-bradykinin] where N-terminal bradykinin arginine is substituted by L-lysine, and serine in position 6 of bradykinin is substituted by glycine, the cycle is closed with peptide bond formed by arginine carbonyl group and ϵ-amino group of lysine of the formula



where Lys -L-lysine residue, Pro -L-proline residue, Gly -glycine residue, Phe -L-phenylalanine residue, Arg - L-arginine residue.

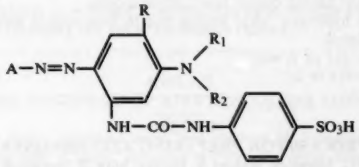
4,187,218

WATER-SOLUBLE ACID AZO DYE

Fabrizio Merlo, Saronno; Giorgio Bornengo, Novara, and Camillo Paffoni, Pogno, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Mar. 15, 1978, Ser. No. 886,943
Claims priority, application Italy, Mar. 17, 1977, 21341 A/77
Int. Cl.[2] C09B *29/36, 29/06*
U.S. Cl. 260—158 **1 Claim**

1. A water-soluble acid azo dye having the formula:



wherein:
A is a residue of a diazotizable aromatic or heterocyclic amine, optionally substituted;
R is selected from the group consisting of H, CH_3, OCH_3 and OC_2H_5;
R_1 is selected from the group consisting of CH_3 and C_2H_5; and
R_2 is selected from the group consisting of CH_3 and C_2H_5.

4,187,219

STARCH COATING PIGMENT FOR PAPER

Thomas K. Maher, LaGrange Park, Ill., assignor to CPC International Inc., Englewood Cliffs, N.J.

Filed Dec. 15, 1977, Ser. No. 861,069
Int. Cl.[2] C08L *3/02*
U.S. Cl. 260—17.4 ST **16 Claims**

1. A process for the production of a pigment coating compo-

sition for paper containing an improved cooked starch product which comprises the steps of:

(a) cooking in water a substantially non-birefringent, cold-water swelling, granular starch product characterized prior to cooking as having less than 10% solubles and a swelling power such that each 5 g. when dispersed in water and held for about 16 hours at 25° C. has a swollen volume of from about 20-ml. to about 35-ml.; and

(b) mixing the cooked starch product characterized as having from greater than 10% solubles to about 40% solubles by weight in water at 25° C. into the clay slip to obtain a pigment coating composition for paper.

4,187,220

NEW O-(3-AMINO-2-HYDROXY-PROPYL)-AMIDOXIME DERIVATIVES, PROCESS FOR THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

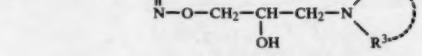
Kalman Takacs; Peter N. Literati; Ilona Kiss, nee Ajzert; Antal Simay; Matyas Szentivanyi; Sandor Virag, and Katalin Farago, all of Budapest, Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R.T., Budapest, Hungary

Filed Aug. 30, 1977, Ser. No. 829,148

Int. Cl.[2] C07D *295/14, 401/12, 403/12*

U.S. Cl. 260—239 B **13 Claims**

1. A compound of the formula I or a pharmaceutically acceptable acid addition salt thereof



(I)

wherein

R^2 and R^3 are polymethylene which together form a five- to eight-membered ring;

R^4 is unsubstituted or halogen-, C_1 to C_4 alkoxy or C_1 to C_4 alkyl mono- or di-substituted phenyl, naphthyl, quinolyl, isoquinolyl, pyridyl, or pyrazolyl;

R^5 is hydrogen or alkyl having one to four carbon atoms, cycloalkyl or phenyl which can be mono- or di-substituted with halogen, alkoxy having one to four carbon atoms or alkyl having one to four carbon atoms;

R^6 is hydrogen, alkyl having one to four carbon atoms or phenyl;

m—0,1 or 2; and

n—0,1 or 2.

4,187,221

PROCESS FOR PREPARING AZETIDINONES

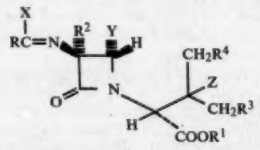
Ronald G. Micetich; Robert A. Fortier, both of Sherwood Park; Chia C. Shaw, Edmonton, and Werner O. Merlo, Devon, all of Canada, assignors to Connlab Holdings Limited, Quebec, Canada

Filed Dec. 27, 1977, Ser. No. 864,705

Int. Cl.[2] C07D *205/08, 403/04*

U.S. Cl. 260—239 A **11 Claims**

1. A compound of formula 1



1

wherein R is an amino-protecting group commonly used in penicillin chemistry derivatives selected from the group consisting of H, C_1–C_6 alkyl, phenyl (optionally substituted in the o—, m—, or p- positions by CH_3, F, Cl, OCH_3, or a nitro group), benzyl, 2-thienylmethyl, tetrazol (1-, 2-, or 5-)yl-methyl, 2-phenyl-5-methylisoxazol-4-yl, phenoxymethyl, and R^5O— and R^5S, wherein R^5 stands for C_1–C_6 alkyl, phenyl, benzyl or trichloroethyl; X is OH, and RCX=N may also represent the phthalimido, succinimido-, or tritylamino- group; R^1 is a carboxy-protecting group commonly used in penicillin chemistry selected from the group consisting of hydrogen, a cleavable acid protective group selected from C_1–C_6 alkyl, methoxymethyl, phenoxymethyl, benzyloxymethyl, trichloroethyl, benzyl, p-halobenzyl, p-nitrobenzyl, p-methoxybenzyl, benzhydryl and trimethylsilyl; R^2 is selected from hydrogen and methoxy; R^3 and R^4 are selected from the group consisting of H, Cl, Br, I, OCHO, $OCOCH_3$, SCl, and SBr with the proviso that one and only one of R^3 or R^4 must be H, Y is selected from Cl and Br, Z is selected from Cl, Br, I, SCl, and SBr and one of R^3, R^4 and Z must be SCl or SBr.

4,187,222

PROCESS FOR THE PREPARATION OF CYCLOPENTADECANOLIDE

Kurt Bauer, and Alfred Körber, both of Holzminden, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 30, 1978, Ser. No. 921,158

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1977, 2731543

Int. Cl.[2] C07D *313/00*

U.S. Cl. 260—343 **2 Claims**

1. In a process for the preparation of cyclopentadecanolide from 13-oxa-bicyclo[10.4.0]-hexadecane-[1(12)] by oxidizing the starting material to the 12-keto-cyclopentadecanolide and converting the keto-lactone to cyclopentadecanolide, the improvement which comprises converting the 12-keto-cyclopentadecanolide or its oxime to the cyclopentadecanolide by reduction with hydrazine in the presence of an alkaline catalyst to form the linear hydroxyacid and thereafter closing the ring.

4,187,223

3-[4-(DISUBSTITUTED-AMINO)PHENYL]-3-(DI-PHENYLAMINO)PHTHALIDES

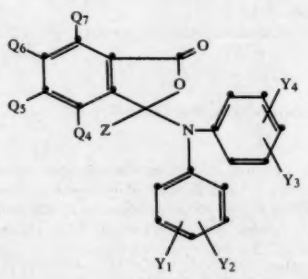
Paul J. Schmidt, Sharonville, and William M. Hung, Cincinnati, both of Ohio, assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 821,927, Aug. 4, 1977, which is a continuation-in-part of Ser. No. 755,183, Dec. 29, 1976, abandoned. This application Sep. 18, 1978, Ser. No. 942,996

Int. Cl.[2] C07D *307/83*

U.S. Cl. 260—343.3 R **18 Claims**

1. A compound having the formula



wherein:

Q_4 is hydrogen or halo;

Q_5 is the same as Q_4; or di-lower-alkylamino, halo or COX when Q_4, Q_6 and Q_7 are each hydrogen;

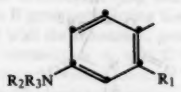
Q_6 is the same as Q_4; or di-lower-alkylamino, halo or COX when Q_4, Q_5 and Q_7 are each hydrogen;

Q_7 is the same as Q_4;

X is hydroxy, benzyloxy, alkoxy having from 1 to 18 carbon atoms or OM where M is an alkali metal cation, an ammonium cation or a mono-, di- or trialkylammonium cation having from 1 to 18 carbon atoms;

Y_1, Y_2, Y_3 and Y_4 are the same or different and are selected from the group consisting of hydrogen, halo, hydroxyl, lower-alkoxy, alkyl having from 1 to 9 carbon atoms, phenyl-lower-alkyl, $COOR_4$ and NR_5R_6 where R_4 and R_5 are hydrogen or lower-alkyl and R_6 is hydrogen, lower alkyl, cycloalkyl having from 5 to 7 carbon atoms, lower-alkanoyl, phenylsulfonyl or lower-alkyl-substituted phenylsulfonyl;

Z is a radical having the formula



in which:

R_1 is selected from the group consisting of hydrogen, halo, lower-alkyl, lower-alkoxy and di-lower-alkylamino;

R_2 is lower-alkyl; and

R_3 is selected from the group consisting of lower-alkyl, benzyl, phenyl, and phenyl substituted with a lower-alkyl or lower-alkoxy group.

4,187,224

2-DECARBOXY-2-HYDROXYMETHYL-5,6-DIHYDRO-PROSLACYLIN ANALOGS

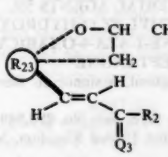
Udo F. Axen, Plainwell, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 857,236, Dec. 5, 1977, Pat. No. 4,125,712, which is a continuation-in-part of Ser. No. 788,146, Apr. 19, 1977, abandoned, which is a continuation-in-part of Ser. No. 691,400, Jun. 1, 1976, abandoned. This application Jun. 19, 1978, Ser. No. 916,634

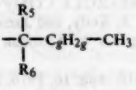
Int. Cl.[2] C07D *307/93*

U.S. Cl. 260—346.22 **28 Claims**

1. A cyclic ether of the formula

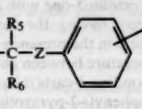


wherein D is (1) a valence bond; (2) $-(CH_2)_d-$ where d is one, 2, 3, 4, or 5; (3) $-CH{=}CH-A-$ where A is a valence bond or $-(CH_2)_h-$ where h is one, 2, or 3; or (4) $-CH_2-O-CH_2-Y-$ where Y is a valence bond or $-(CH_2)_k-$ where k is one or 2; wherein R_2 is



(1)

wherein C_gH_{2g} is alkylene of one to 9 carbon atoms, inclusive, with one to 5 carbon atoms, inclusive, in the chain between $-CR_5R_6-$ and terminal methyl, wherein R_5 and R_6 are hydrogen, alkyl of one to 4 carbon atoms, inclusive, or fluoro, being the same or different, with the proviso that one of R_5 and R_6 is fluoro only when the other is hydrogen or fluoro; or



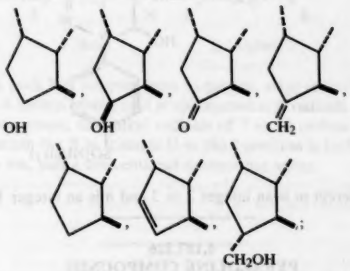
(2)

wherein R_5 and R_6 are as defined above with the proviso that neither R_5 nor R_6 is fluoro when Z is oxa (—O—); wherein Z represents an oxa atom (—O—) or C_jH_{2j} wherein C_jH_{2j} is a valence bond or alkylene of one to 9 carbon atoms, inclusive, with one to 6 carbon atoms, inclusive between $-CR_5R_6-$ and the phenyl ring; wherein T is alkyl of one to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $-OR_7$ wherein R_7 is alkyl of one to 4 carbon atoms, inclusive, and s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl and when s is 2 or 3 the T's are either the same or different;

wherein Q_3 is

wherein R_3 is hydrogen or alkyl of one to 4 carbon atoms, inclusive;

wherein R_{23} is



wherein R_{31} is $-CH_2OH$ with the proviso that R_{31} is not $-CH_2OH$ when D is a valence band,

and wherein ~ indicates attachment in alpha or beta configuration; including the lower alkanoates thereof.

4,187,225

NOVEL SYNTHESIS OF BIS PYRAZOLONE OXONOL DYES

Henry Bader, Newton Center, and Michael H. Feingold, Randolph, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 3, 1978, Ser. No. 883,182

Int. Cl.[2] C07D *23/42;* **C09B** *23/02*

U.S. Cl. 260—239.9 **33 Claims**

1. A method of preparing a bis-pyrazolone oxonol compound which comprises:

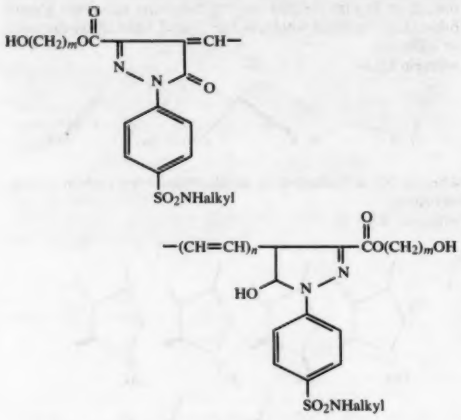
(1) reacting (a) a p-N-alkylsulfonamidophenylhydrazine or its hydrochloride with (b) about a 10 to 20% molar excess of sodium diethyl oxalacetate in an inert, alkali-stable organic solvent at a temperature between about 50° and 100° C. to yield a 3-carbethoxy-1-(p-N-alkylsulfonamidophenyl)-2-pyrazolin-5-one;

(2) hydrolyzing said 3-carbethoxy-1-(p-N-alkylsulfonamidophenyl)-2-pyrazolin-5-one in situ with aqueous alkali at room temperature to give the corresponding 3-carboxy-1-(p-N-alkylsulfonamidophenyl)-2-pyrazolin-5-one;

(3) removing substantially all of the impurities from said 3-carboxy-1-(p-N-alkylsulfonamidophenyl)-2-pyrazolin-5-one;

(4) reacting said purified 3-carboxy-1-(p-N-alkylsulfonamidophenyl)-2-pyrazolin-5-one with a five to twenty-fold amount of a glycol having the formula $HO(CH_2)_mOH$ wherein m is 2 or 3 in the presence of boron trifluoride-etherate at a temperature between about 50° and 100° C. to yield the corresponding 3-carb(β-hydroxy)alkoxy-1-(p-N-alkylsulfonamidophenyl)-2-pyrazolin-5-one; and

(5) reacting said 3-carb(β-hydroxy)alkoxy-1-(p-N-alkylsulfonamidophenyl)-2-pyrazolin-5-one with a stoichiometric amount of glutaconaldehyde dianil hydrochloride or malonaldehyde dianil hydrochloride at a temperature between about −20° and 25° C. in an inert organic solvent in the presence of a condensing agent to yield a bis-pyrazolone oxonol compound having the formula



wherein m is an integer 2 or 3 and n is an integer 1 or 2.

4,187,226

PYRAZOLINE COMPOUNDS

Manfred Patsch, and Albert Hettche, both of Ludwigshafen, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

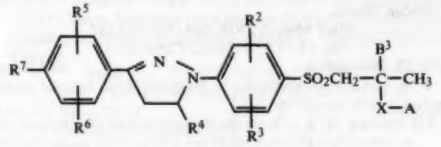
Division of Ser. No. 702,975, Jul. 6, 1976, Pat. No. 4,129,563. This application Apr. 21, 1978, Ser. No. 898,630

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1975, 2534180; Aug. 6, 1975, 2535095; Nov. 11, 1975, 2550548

Int. Cl.² C07D *401/12, 231/06*

U.S. Cl. 260—239.8 **3 Claims**

1. A compound of the formula



in which

B^3 is hydrogen or C_1 to C_4 alkyl,

R^2, R^3, R^5, R^6 and R^7 are independently hydrogen, chlorine, bromine, fluorine, methyl, ethyl, methoxy or ethoxy,

R^4 is hydrogen, C_1 to C_4 alkyl, benzyl, phenylethyl, phenyl or phenyl substituted by chlorine, bromine, methyl, ethyl, methoxy, ethoxy, cyano or hydroxysulfonyl,

X is —O—,

R^8 is hydrogen, C_1 to C_4 alkyl or C_2 or C_3 alkyl substituted by hydroxy or C_1 to C_4 alkyl and

A is C_2 or C_3 alkyl substituted by C_1 to C_4 dialkylamino, piperidino, pyrrolidino or hexamethyleneimino.

4,187,227

MANUFACTURE OF 2,4-DIOXO-OXAZOLIDINES

Norbert Goetz, Worms; Dietrich Mangold, Neckargemuend, and Bernd Zeeh, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

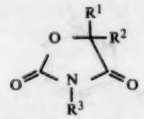
Filed Feb. 21, 1978, Ser. No. 879,724

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1977, 2711659

Int. Cl.² C07D *263/44*

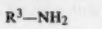
U.S. Cl. 548—226 **2 Claims**

1. A process for the manufacture of a 2,4-dioxooxazolidine of the formula I



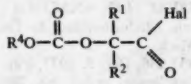
I

where R^1 and R^2 are identical or different and each is a saturated or a mono-olefinically unsaturated aliphatic hydrocarbon radical of 1 to 4 carbon atoms and R^3 is 3,5-dichlorophenyl, wherein an aniline compound of the formula III



III

where R^3 has the above meaning, is reacted with an α-hydroxycarboxylic acid derivative of the formula II



II

where R^1 and R^2 have the above meanings, Hal is halogen and R^4 is alkyl of 1 to 4 carbon atoms, in the presence of tertiary amine at 20° to 120° C.

4,187,228

ANTIBACTERIAL AGENTS 5R, 2S-HYDROXYMETHYL-3Z (2-HYDROXY- OR 2-ALKOXYETHYLIDENE-1-AZA-4-OXABICYCLO[3,2,0-]HEPTANONE

Kong Luk, Cranleigh, England, assignor to Beecham Group Limited, England

Filed Feb. 24, 1978, Ser. No. 880,949

Claims priority, application United Kingdom, Mar. 4, 1977, 9128/77

Int. Cl.² C07D *263/14;* **A61K** *31/42*

U.S. Cl. 260—245.3 **1 Claim**

1. 5R,2S-Hydroxymethyl-3Z-(2-hydroxyethylidene)-1-aza-4-oxa-bicyclo[3.2.0]heptan-7-one.

4,187,229

BIS-BENZOTRIAZOLE COMPOUNDS

Gether Irick, Jr.; Charles A. Kelly, and James C. Martin, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 715,013, Aug. 16, 1976, Pat. No. 4,085,089. This application Feb. 3, 1978, Ser. No. 875,029

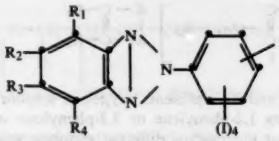
Int. Cl.² C07D *249/20*

U.S. Cl. 548—260 **52 Claims**

1. A compound having the formula:

A—B—C

wherein A is a group having the structure

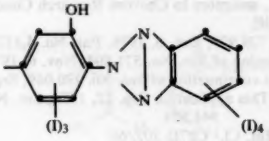


wherein

R_1, R_2, R_3 and R_4 are hydrogen, chloro, bromo, lower alkyl, cyclohexyl, phenyl, lower alkylphenyl, phenyl-substituted-phenyl, alkoxy, carboalkoxy;

I is the same as R_1, R_2, R_3 and R_4 and is present on all positions of the benzenoid ring, except the carbon atom attached to the heterocyclic ring and the carbon atom attached to the B group connecting the heterocyclic aromatic A group with the aromatic C group, wherein B is a linking group connecting A and C and is oxy, carbonyloxy, oxycarbonylalkyleneoxy, alkyleneoxycarbonyloxy, oxyalkylenecarbonyloxy, oxycarbonyloxy, alkyleneoxy, oxyalkylene, alkyleneoxyalkyleneoxy, oxyalkylenephenylenealkyleneoxy, thio, thioalkyleneoxy, sulfinyldioxy, oxy(alkoxy)phosphinooxy, carbonylamino, N-alkylcarbonylamino, N-phenylcarbonylamino, aminocarbonylalkyleneoxy, N-alkylaminocarbonylalkyleneoxy, N-phenylaminocarbonylalkyleneoxy, aminocarbonylamino, N-alkylaminocarbonylamino, N-alkylamino, N-phenylamino, N-alkylaminoalkyleneoxy, N-phenylaminoalkyleneoxy, oxyalkyleneoxy, oxyphenyleneoxy, and

wherein C is a group having the formula



where I is the same substituent as listed above and is present in all positions of the benzenoid rings except the carbon atom attached to the B group connecting the A and C moieties, and said I substituents can all be one of the substituents listed above or different listed substituents.

4,187,230

PREPARATION OF 5-AROYL-PYRROLE COMPOUNDS

Karl E. Wiegand; James T. F. Kao, and Michael J. Dagani, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Continuation of Ser. No. 580,761, May 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 480,009, Jun. 17, 1974, abandoned. This application Nov. 7, 1977, Ser. No. 848,936

Int. Cl.[2] C07D *207/32, 409/06*

U.S. Cl. 260—326.47 **23 Claims**

1. A process for the preparation of 5-aroyl-pyrrole-2-acetic acid compounds, comprising the steps of mixing an aroyl halide selected from tolyoyl, benzoyl, p-chlorobenzoyl, thienoyl halide and such aroyl halides having the aromatic nucleus mono-, di-, or tri-substituted with groups selected from lower alkyl, halo, cyano, nitro, amino, lower alkoxy, methylthio and trifluoromethyl groups with a pyrrole compound having a group selected from cyano, carboxy, lower alkyl carboxylic acid ester, amide, lower alkyl substituted amide and dilower alkyl substituted amide groups attached in the 2-position to the pyrrole ring structure via a methylene group and adding a lower alkyl aluminum halide while maintaining the resultant mixture at a temperature of about 0° to about 40° C. whereby a 5-aroyl-pyrrole-2-acetic acid compound is produced.

4,187,231

CYANIDE-CATALYZED ISOMERIZATION AND DEUTERIUM EXCHANGE WITH ALPHA- AND BETA-SULFOLENES

Raymond L. Cobb, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 16, 1977, Ser. No. 852,138

Int. Cl.[2] C07D *333/48*

U.S. Cl. 260—332.1 **7 Claims**

1. The deuterating of an alpha- and/or beta-sulfolene at a temperature in the approximate range −10° C. to 95° C. which comprises bringing together at least one of alpha- and beta-sulfolene, which can be represented by the following formula:

I (Beta) II (Alpha)

wherein each R is selected from hydrogen, alkyl radicals having 1 to 6 carbon atoms, aryl or substituted aryl radicals of 6 to 10 carbon atoms, or aralkyl radicals of 7 to 12 carbon atoms and wherein the R in formula II in the 2-position is hydrogen, cyanide ion, and a conventional deuterating agent.

4,187,232

ACYLAMINO DERIVATIVES

Delme Evans, Chalfont St. Peter; Michael R. J. Jolley, Camberley; William J. Ross, Lightwater, and Brian P. Swann, Camberley, all of England, assignors to Lilly Industries Limited, London, England

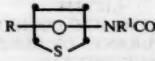
Division of Ser. No. 691,961, Jun. 1, 1976, abandoned. This application Jan. 19, 1978, Ser. No. 870,960

Claims priority, application United Kingdom, Jun. 5, 1975, 24223/75

Int. Cl.[2] C07D *333/24*

U.S. Cl. 549—69 **4 Claims**

1. A compound of the formula:



wherein

R is hydrogen, C_1–C_4 alkyl or phenyl optionally substituted by halogen, trifluoromethyl or C_1–C_3 alkoxy;

R^1 is C_3–C_6 alkenyl, C_3–C_6 alkynyl, or benzyl optionally substituted by halogen or nitro; and

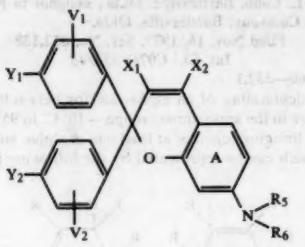
R^2 is C_1–C_7 alkyl, C_3–C_{10} cycloalkyl, phenyl or benzyl; provided that, when R is hydrogen or C_1–C_4 alkyl and R^1 is C_3–C_6 alkenyl or C_3–C_6 alkynyl, R^2 cannot be C_3–C_{10} cycloalkyl.

4,187,233
PRESSURE-SENSITIVE OR HEAT-SENSITIVE RECORDING MATERIAL AND NOVEL 2,2-DIARYLCHROMENO COMPOUNDS USED THEREIN

Jean C. Petitpierre, Kaiseraugst, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 30, 1978, Ser. No. 873,582
Claims priority, application Switzerland, Feb. 4, 1977, 1379/77
Int. Cl.² C07D *311/02*
U.S. Cl. 260—345.2 5 Claims

1. A 2,2-diarylchromeno compound of the formula



wherein

V_1 and V_2, each represent hydrogen, chlorine, lower alkyl or lower alkoxy,

Y_1 and Y_2, each represent hydrogen, -O-R_1 or

X_1 and X_2, each independently of the other, represent hydrogen, alkyl of up to 12 carbon atoms which is unsubstituted, or represent benzyl, phenyl, or benzyl or phenyl which is substituted by chlorine, nitro, lower alkyl, lower alkoxy or the amino group

and

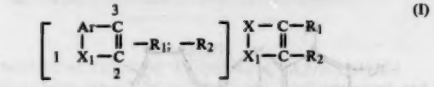
R_1, R_2, R_3, R_4, R_5 and R_6, each independently of the other, represent alkyl of not more than 12 carbon atoms which is unsubstituted or substituted by cyano or lower alkoxy, or represents cycloalkyl, phenyl, benzyl, or phenyl or benzyl which is substituted by chlorine, nitro, lower alkyl or lower alkoxy.

4,187,234
ALKANECARBOXYLIC ACID COMPOUNDS WHICH HAVE BENZOFURANYL OR BENZOTHIENYL SUBSTITUENTS

Raymond Bernasconi, Oberwil, and Pier G. Ferrini, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

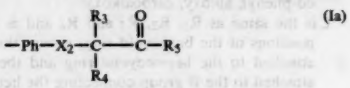
Continuation of Ser. No. 798,272, May 19, 1977, abandoned. This application Aug. 4, 1978, Ser. No. 931,055
Claims priority, application Switzerland, May 31, 1976, 6783/76
Int. Cl.² C07D *307/80*
U.S. Cl. 260—346.22 12 Claims

1. An alkanecarboxylic acid compound of the formula



(I)

in which one of X and X_1 represents oxygen or sulphur, and the other represents 1,2-phenylene or 1,2-phenylene substituted by one to four identical or different members selected from the group consisting of lower alkyl, lower alkoxy, halogen and trifluoromethyl, R_1 represents the radical of the formula



(Ia)

in which Ph represents 1,3- or 1,4-phenylene or such phenylene substituted as said 1,2-phenylene moiety X or X_1,X_2 represents oxygen or sulphur, R_3 and R_4 independently of one another denote hydrogen or alkyl with up to 12 carbon atoms and R_5 represents hydroxyl, amino, lower alkoxy, hydroxy-lower alkoxy, phenyl-lower alkoxy, pyridyl-lower alkoxy, lower alkylamino, di-lower alkylamino or hydroxylamino, and R_2 denotes hydrogen, lower alkyl or said radical of the formula Ia; or a pharmaceutically usable salt of said acids with R_5 being hydroxyl.

4,187,235
METHOD FOR PREPARING MALEIC ANHYDRIDE

Kiyoshi Katsumoto, El Cerrito, and David M. Marquis, Lafayette, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 729,920, Oct. 6, 1976, Pat. No. 4,132,670, which is a continuation of Ser. No. 521,604, Nov. 6, 1974, abandoned, which is a continuation of Ser. No. 290,049, Sep. 18, 1972, abandoned. This application Sep. 22, 1978, Ser. No. 944,951
Int. Cl.² C07D *307/60*
U.S. Cl. 260—346.75 3 Claims

1. A process for oxidizing a feed hydrocarbon to maleic anhydride which comprises contacting the hydrocarbon under conditions sufficient to convert the hydrocarbon feed to maleic anhydride with a catalyst having an intrinsic surface area of at least 10 m^2/g prepared by a process comprising the steps of:

(a) heating vanadium pentoxide with a substantially anhydrous primary or secondary alcohol liquid reducing agent to reduce the vanadium of the vanadium pentoxide to a valence between 4.0 and 4.6 and thereby obtain a vanadium-containing feed,

(b) contacting on orthophosphoric acid with the vanadium-containing feed to form a heterogeneous reaction mixture of suspended vanadium (IV) phosphate,

(c) removing liquid from the heterogeneous mixture to obtain the vanadium (IV) phosphate compound, and

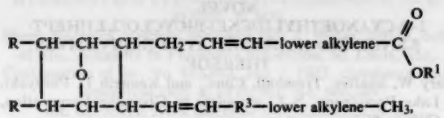
(d) calcining the vanadium (IV) phosphate compound to obtain said catalyst.

4,187,236
7-OXABICYCLOHEPTANE COMPOUNDS

Peter W. Sprague, Pennington, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 848,543, Nov. 4, 1977, Pat. No. 4,143,054. This application Nov. 6, 1978, Ser. No. 958,330
Int. Cl.² C07D *307/16*
U.S. Cl. 260—346.22 7 Claims

1. A compound having the structural formula

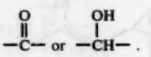


and stereoisomers thereof, wherein

each R is independently hydrogen or hydroxy, provided at least one R is hydroxy;

R^1 is hydrogen or lower alkyl; and

R^3 is



4,187,237

PROCESS FOR THE MANUFACTURE OF A FURANCARBOXYLIC ACID ANILIDE

Wolfgang Deinhammer; Rudolf Kaufmann, both of Burghausen; Hermann Braunling, and Norman Haberle, both of Munich, all of Fed. Rep. of Germany, assignors to Consortium for Elektrochemische Industrie GmbH, Munich, Fed. Rep. of Germany

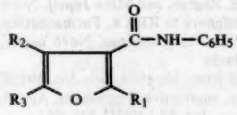
Filed Jan. 2, 1979, Ser. No. 480

Claims priority, application Fed. Rep. of Germany, Jan. 5, 1978, 2800504

Int. Cl.² C07D *307/68*

U.S. Cl. 260—347.3 **5 Claims**

1. A process for the manufacture of furancarboxylic acid anilides of the general formula



in which R_1 represents an aryl group or an alkyl group, R_2 and R_3 each represent an alkyl group or hydrogen, by a ring-closure reaction of a β-ketoester with an α-haloaldehyde or alpha-haloketone, in the presence of a stoichiometric amount of a halide-binding substance, to form a furancarboxylic acid ester and by subsequent anilidation, the reaction being performed in two stages, the ring-closure reaction being carried out in the presence of a mixture of alkaline earth metal carbonates and pyridine in a ratio of from 1000 to 5:1 Val, based on the hydrohalic acid liberated, at temperatures between 50° and 100° C.; and, after separation in said second stage, the furancarboxylic ester is reacted while stirring with aniline in up to 20 times molecular excess, in the presence of equimolar amounts based on the furancarboxylic acid, of a member of the group consisting of magnesium dianilide, aluminum trianilide, and a mixture of both, in liquid phase or in suspension at temperatures between 20° and 180° C., under normal pressure.

4,187,238

ANTHRAQUINONE DISPERSE DYES

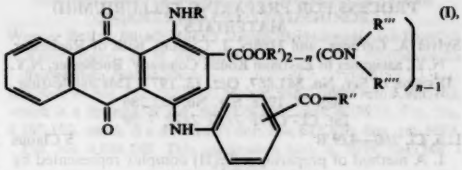
Urs Karlen, Magden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 842,188, Oct. 14, 1977, abandoned, which is a continuation of Ser. No. 705,850, Jul. 16, 1976, abandoned. This application Aug. 21, 1978, Ser. No. 935,394

Int. Cl.² C07C *49/68*

U.S. Cl. 260—376 **8 Claims**

1. Disperse dyes of the formula (I)



wherein R represents substituted or unsubstituted alkyl, cycloalkyl or hydrogen, R′ represents substituted or unsubstituted alkyl, cycloalkyl, aralkyl or phenyl, and R″ represents a radical of the formula —OX, wherein X represents substituted or unsubstituted alkyl, cycloalkyl, aralkyl or phenyl and n is 1.

4,187,239

METHOD FOR PREPARING ORGANOTIN COMPOUNDS

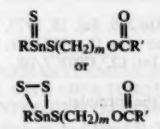
Robert D. Dworkin, Old Bridge, N.J., assignor to M&T Chemicals Inc., Woodbridge, N.J.

Continuation-in-part of Ser. No. 738,132, Nov. 2, 1976. This application Jul. 20, 1978, Ser. No. 926,516

Int. Cl.² C07F *7/22*

U.S. Cl. 260—410.6 **11 Claims**

1. A method for preparing an organotin compound of the general formula



wherein R and R′ are individually selected from the group consisting of alkyl containing from 1 to 20 carbon atoms, cycloalkyl, aralkyl, aryl and alkaryl and m is 2 or 3, said method consisting essentially of the following sequence of steps:

(1) reacting a monoorganotin trihalide of the formula $RSnX_3$ wherein X is a halogen selected from the group consisting of chlorine, bromine and iodine, with an aqueous solution containing a stoichiometric amount of a base selected from the group consisting of ammonium hydroxide, alkali metal hydroxides and alkaline earth metal hydroxides, wherein the ratio of the number of equivalent weights of base to the number of moles of monoorganotin trihalide is 1:1;

(2) adding an equimolar amount, based on said monoorganotin trihalide, of 2 mercaptoethanol or 3-mercaptopropanol to the resultant mixture;

(3) adding to the reaction product of step 2 an alkali metal sulfide or an alkali metal disulfide, the numbger of moles of sulfide or disulfide being equal to the number of moles of tin present in said reaction product;

(4) separating an aqueous phase from the reaction mixture;

(5) reacting the product obtained thereby with an equimolar amount, based on said monoorganotin trihalide, of a carboxylic acid, R′COOH, or an ester R′COOR″ wherein R″ is alkyl and contains from 1 to 20 carbon atoms, while removing any by-product water from the reaction mixture; and

(6) isolating said organotin compound in the form of the liquid residue remaining following removal of said by-product water.

4,187,240

PROCESS FOR PREPARING TELLURIUM(II) MATERIALS

Sylvia A. Gardner, and Henry J. Gysling, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 841,857, Oct. 13, 1977. This application Aug. 28, 1978, Ser. No. 937,286

Int. Cl.[2] C07F *7/30, 7/22, 7/24*

U.S. Cl. 260—429 R **5 Claims**

1. A method of preparing a Te(II) complex represented by the formula:

$$RTeM(R')_3$$

wherein M is Pb, Sn, Ge or Si; R and R' are each selected from the group consisting of alkyl containing 1 to 12 carbon atoms and aryl containing 6 to 12 carbon atoms, comprising the steps, in sequence, of (a) reacting an aryl or alkyl telluride containing up to 12 carbon atoms with a reducing agent and an alkali metal hydroxide to provide an alkali metal salt of said telluride, and then (b) reacting the resulting alkali metal salt from (a) with a compound represented by the formula:

$$M(R')_3Cl$$

to provide said Te(II) complex.

4,187,241

METAL PHOSPHINE COMPLEX

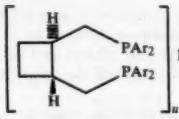
John M. Townsend, Montclair, and Donald H. Valentine, Jr., Highland Park, both of N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.

Division of Ser. No. 816,235, Jul. 18, 1977, Pat. No. 4,120,870. This application May 10, 1978, Ser. No. 904,688

Int. Cl.[2] C07F *1/08*

U.S. Cl. 260—438.1 **2 Claims**

1. A compound of the formula:



wherein P is phosphorus; Ar is substituted or unsubstituted aryl; M is a Group IB or IIB metal; X is tetraphenylborate, halide, perchlorate, tetrahalogenoborate, hexahalogenophosphate or hexahalogenoantimonate, wherein said halogenates are fluorine or chlorine; u is an integer from 1-3; r and s are 1 or 2 depending on the valence of M and the value of u,

the dimers and oligomers thereof.

4,187,242

CATALYTIC AROMATIC CARBONATE PROCESS

Alan J. Chalk, Kinnelon, N.J., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 731,495, Dec. 12, 1976, abandoned. This application Apr. 3, 1978, Ser. No. 892,497

Int. Cl.[2] C07C *68/00*

U.S. Cl. 260—463 **22 Claims**

1. An aromatic carbonate process which comprises contacting a phenol, carbon monoxide, a base, the Group VIIIB element selected from ruthenium, rhodium, palladium, osmium, iridium or platinum, and an oxidant having an oxidation potential greater than that of the said selected Group VIIIB element.

4,187,243

NOVEL 2-(2-CYANOETHYLIDENE)-BICYCLO[2.2.1]HEPT-5-ENES AND HYDROGENATED DERIVATIVES THEREOF

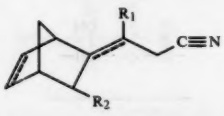
Gary W. Shaffer, Trumbull, Conn., and Kenneth L. Purzycki, Lake Parsippany, N.J., assignors to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 860,660, Dec. 15, 1977, Pat. No. 4,132,677. This application Jul. 25, 1978, Ser. No. 927,788

Int. Cl.[2] C07C *121/46, 121/48*

U.S. Cl. 260—464 **11 Claims**

1. A compound of the general formula:



wherein: R_1 and R_2 may be alike or different and are chosen from the group consisting of hydrogen or methyl and the dotted line between two carbons indicates that the carbons are connected by either a single or a double bond.

4,187,244

PROCESS FOR THE RESOLUTION OF RACEMIC ALPHA-AMINONITRILES

Marijan Hohnjec, Zagreb, and Miha Japelj, Novo mesto, both of Yugoslavia, assignors to KRKA, Farmaceutika, Kemija, Kozmetika, zdravilisca in gostinstuo, Novo mesto, n.sd.o., Novo Mesto, Yugoslavia

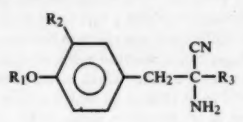
Filed Mar. 30, 1978, Ser. No. 891,973

Claims priority, application Yugoslavia, Apr. 8, 1977, 937/77

Int. Cl.[2] C07C *121/66*

U.S. Cl. 260—465 E **16 Claims**

1. Process for the resolution of racemic α-aminonitriles of the general formula:



(I)

wherein

R_1 stands for a hydrogen atom or a methyl group,

R_2 stands for a hydrogen atom or a methoxy group, and

R_3 stands for a hydrogen atom or a methyl group, into optically active enantiomers, which comprises:

(A) treating said recemic α-aminonitriles with (−)-mandelic acid in an alkanol/C_{5-8} hydrocarbon mixture in order to thereby obtain a racemic mixture of diastereoisomeric D and L salts of (−)-mandelic acid;

(B) macerating said racemic mixture of diastereoisomeric D and L salts of (−)-mandelic acid with an alkanol/C_{5-8} hydrocarbon mixture to thereby obtain a salt of D- and L-aminonitrile respectively with (−)-mandelic acid;

(C) neutralizing the L-form;

(D) extracting the neutralized product obtained in step (C) above with a chlorinated aliphatic hydrocarbon; and

(E) converting said neutralized product to a hydrochloride or acetyl derivative.

4,187,245
HYDROXYPROPYLENE-AMINO-PHOSPHONIC-SULFONIC ACIDS

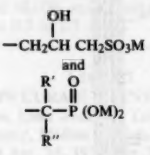
Derek Redmore, Ballwin, and Frederick T. Welge, Affton, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Continuation of Ser. No. 582,862, Jun. 2, 1975, abandoned. This application Dec. 4, 1978, Ser. No. 966,249

Int. Cl.[2] C07F *9/38*; C07D *307/04, 233/22, 239/00*

U.S. Cl. 260—502.5 11 Claims

1. A compound containing one to five of each of the following amino nitrogen-bonded groups:



where R′ and R″ are hydrogen or alkyl and M is hydrogen or a salt ion selected from alkali metal, ammonium, alkaline earth metal and the ammonium form of triethanolamine and diethanolamine, the nitrogen to which said groups are bonded being at least one amino nitrogen of a moiety which, with hydrogen replacing said nitrogen bonded groups (I) and (II), is an amine which contains hydrogen attached to nitrogen and is selected from the group consisting of monoamines of the formula RNH_2, where R is alkyl or cycloalkyl, alkanolamines, polyamines selected from alkylene polyamines and polyalkylene polyamines and said polyamines substituted in a terminal nitrogen by alkyl, cycloalkyl, aryl or aralkyl, furfurylamine, ethylenebisoxypropylamine, and cyclic amidines having an amino side chain.

4,187,246
AMIDES OF 2,4,6-TRIALKYL-3-HYDROXYPHENYLALKANOIC ACIDS

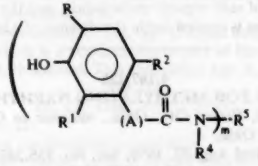
John D. Spivack, Spring Valley, and Martin Dexter, Briarcliff Manor, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 693,387, Jun. 7, 1976, Pat. No. 4,093,618, which is a division of Ser. No. 494,156, Aug. 2, 1974, Pat. No. 3,988,363, which is a continuation-in-part of Ser. No. 400,603, Sep. 25, 1973, abandoned. This application Mar. 16, 1978, Ser. No. 887,151

Int. Cl.[2] C07C *103/26, 103/78*

U.S. Cl. 260—559 R 4 Claims

1. A compound having the formula



wherein

R is tert-butyl,

R^1 and R^2 are methyl,

R^4 is hydrogen or methyl,

R^5 is n-octadecyl or hexamethylene,

A is methylene, and

m is an integer of 1 to 2.

4,187,247
9-SUBSTITUTED PHENYL-3,7-DIMETHYL-NONA 2,4,6,8-TETRAENE COMPOUNDS

Werner Bollag, Basel; Rudolf Ruegg, Bottmingen, and Gottlieb Ryser, Basel, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

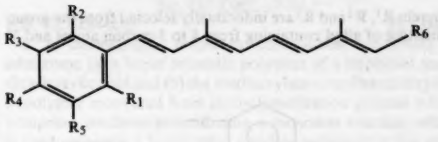
Division of Ser. No. 903,639, May 8, 1978, Pat. No. 4,163,103, which is a division of Ser. No. 816,409, Jul. 18, 1977, Pat. No. 4,107,190, which is a division of Ser. No. 613,676, Sep. 15, 1975, Pat. No. 4,054,589. This application Mar. 8, 1979, Ser. No. 19,025

Claims priority, application Switzerland, Sep. 26, 1974, 13032/74; Jul. 9, 1975, 8962/75

Int. Cl.[2] C07C *47/48, 41/52, 41/00*

U.S. Cl. 260—574 1 Claim

1. A compound of the formula:



wherein one of R_1 and R_2 is halogen or lower alkyl, and the other is halogen or lower alkoxy; R_3 and R_5 are hydrogen, halogen or lower alkyl; with the proviso that one of R_3 and R_5 is other than halogen; R_4 is halogen, lower alkoxy, amino, mono(lower alkyl)amino or di(lower alkyl) amino; and R_6 is formyl, hydroxymethyl, or alkoxymethyl and salts thereof.

4,187,248
MAKING A NITRODIARYLAMINE BY REACTING AN ALKALI METAL SALT OF A FORMAMIDE WITH A NITROHALOARENE

Helmut L. Merten, Hudson, and Gene R. Wilder, Medina, both of Ohio, assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 23, 1977, Ser. No. 854,109

Int. Cl.[2] C07C *85/20*

U.S. Cl. 260—576 14 Claims

1. The process which comprises forming a nitrodiarylamine by reacting a sodium, potassium, rubidium or cesium salt of the formyl derivative of an aromatic primary amine with nitrohaloarene containing halogen reactive with such salt the reaction being promoted in the case of a sodium salt with the formyl derivative of an aromatic primary amine in an amount of at least 0.4 mole per mole of nitrohaloarene.

4,187,249
PROMOTING THE REACTION OF SODIUM SALTS OF FORMYL DERIVATIVES OF AROMATIC AMINES TO FORM NITRODIARYLAMINES

Otto W. Maender, Copley, and Gene R. Wilder, Medina, both of Ohio, assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 27, 1977, Ser. No. 864,195

Int. Cl.[2] C07C *85/20*

U.S. Cl. 260—576 7 Claims

1. The process which comprises forming nitrodiarylamine by reacting in the presence of a polar solvent

(A) the sodium salt of the formyl derivative of an aromatic amine with

(B) nitrohaloarene containing reactive halogen and

(C) a reaction promoting amount of a compound of potassium, cesium or rubidium or mixture thereof effective for promoting the reaction.

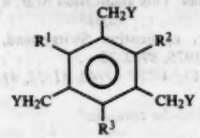
4,187,250

NOVEL TRIFUNCTIONAL AROMATIC AMINES

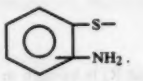
Gabriel Karoly, Springfield, N.J., assignor to M&T Chemicals Inc., Woodbridge, N.J.

Filed Jun. 5, 1978, Ser. No. 912,229
Int. Cl.[2] C07C *87/50*
U.S. Cl. 260—578 **2 Claims**

1. A trifunctional amine of the general formula



wherein R^1, R^2 and R^3 are individually selected from the group consisting of alkyl containing from 1 to 3 carbon atoms and Y is



4,187,251

MALODOR COUNTERACTANTS

Alfred A. Schleppnik, No. 1 Hanley Downs, St. Louis, Mo. 63117

Continuation-in-part of Ser. No. 771,753, Dec. 16, 1976, abandoned. This application May 22, 1978, Ser. No. 908,423
Int. Cl.[2] C07C *49/43*
U.S. Cl. 260—586 R **2 Claims**

1. 4-ethylcyclohexyl methyl ketone.
2. 4-isopropylcyclohexyl methyl ketone.

4,187,252

TETRAMETHYLPENTANE BLOOD SUBSTITUTES

Richard J. Lagow, Austin, Tex.; Lawrence A. Shimp, Hinsdale, Ill., and Leland C. Clark, Jr., Cincinnati, Ohio, assignors to Suntech, Inc., Philadelphia, Pa. and Children's Hospital Medical Center, Cincinnati, Ohio

Division of Ser. No. 827,999, Aug. 26, 1977, Pat. No. 4,110,474. This application Apr. 3, 1978, Ser. No. 892,806
Int. Cl.[2] C07C *19/08*
U.S. Cl. 260—653 **2 Claims**

1. Perfluoro-2,2,4,4-tetramethylpentane.
2. 3-Hydro-nonadecafluoro-2,2,4,4-tetramethylpentane.

4,187,253

PROCESS AND APPARATUS FOR ISOTHERMAL CHLORINATION OF HYDROCARBONS

Bruce E. Kurtz, Marcellus, N.Y., assignor to Allied Chemical Corporation, Morristown, N.J.

Continuation-in-part of Ser. No. 363,445, May 24, 1973, abandoned, which is a division of Ser. No. 167,733, Jul. 30, 1971, abandoned. This application Dec. 29, 1975, Ser. No. 644,788
Int. Cl.[2] C07C *17/02*
U.S. Cl. 260—662 R **7 Claims**

1. A process for isothermal chlorination of a feed stream selected from the group consisting of hydrocarbons having from 1 to 2 carbon atoms, their partially chlorinated derivatives and mixtures thereof, to form chlorinated hydrocarbons under improved temperature and distribution conditions which comprises: (a) passing said feed stream under pressure and in laminar flow into one end of a first elongated gas zone, (b) passing a gas containing chlorine into a second elongated gas zone positioned along said first gas zone, said first and second elongated gas zones being separated along the major length thereof by a porous member, (c) maintaining the pressure of the gas in said second gas zone in excess of the pressure in said first gas zone for diffusion of chlorine into said first gas zone, (d) maintaining said first gas zone under conditions sufficient to effect reaction therein of at least a portion of said diffused chlorine with the feed stream for production of the desired chlorinated hydrocarbon, and (e) withdrawing the gas product containing the desired chlorinated hydrocarbon from the other end of said first gas zone.

4,187,254

GRIGNARD REAGENTS AND PROCESSES FOR MAKING THEM

Karel Bujadoux, Lens; Jean-Marie Neyer, Bethune, and Jean-Pierre Houzeaux, Noeux les Mines, all of France, assignors to Societe Chimique des Charbonnages - CdF Chimie, Bully-les-Mines, France

Filed Nov. 2, 1977, Ser. No. 847,824
Claims priority, application France, Nov. 9, 1976, 76 33757
Int. Cl.[2] C07F *3/02*
U.S. Cl. 260—665 G **12 Claims**

1. In a continuous process for preparing an organometallic halide having the formula:

$$(RMX)(MX_2)_a(MR_2)_b(MH_2)_c$$

wherein $a \leqq 0.45$, $b \leqq 0.15$, and $c \leqq 0.30$, X is a halogen, R is an organic radical, and M is a metal selected from the group consisting of magnesium, zinc, beryllium, and calcium by reaction between an organic monohalide RX and a metal M under an inert and dry gas atmosphere, said metal being in molar excess with respect to said monohalide, the improvement wherein said metal is in the form of convex solid grains of a size between 1 and 15 mm, the reaction temperature is lower than the temperature at which decomposition of the organometallic halide RMX begins and at least 10° C. higher than the boiling point of said organic monohalide, and the reaction is a dry process that is carried out in the absence of a liquid solvent.

4,187,255

PROCESS FOR METHYLATING NAPHTHALENE

John R. Dodd, Ponca City, Okla., assignor to Conoco, Inc., Ponca City, Okla.

Filed Aug. 21, 1978, Ser. No. 935,285
Int. Cl.[2] C07C *15/24*
U.S. Cl. 585—467 **11 Claims**

1. A process for preparing a mixture of 1-methylnaphthalene and 2-methylnaphthalene wherein the process comprises reacting in vapor phase from about 0.5 mole to about 6.0 moles of methanol with 1 mole of naphthalene at a temperature in the range of about 425° C. to about 700° C. and a pressure in the range of about 1 to about 70 atmospheres in the presence of an effective amount of activated alumina.

4,187,256

POLYALKYLENIMINE-ALKYLENE SULFIDE GRAFT COPOLYMER AND METHOD OF MAKING SAME

Giffin D. Jones, and Robert G. Asperger, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 4, 1978, Ser. No. 948,464
Int. Cl.[2] C08L *61/20, 79/04, 81/04*
U.S. Cl. 525—471 9 Claims

1. A graft copolymer consisting essentially of (1) a reaction product of a lower aliphatic ketone and a poly(alkylenimine), said polyalkylenimine having a molecular weight of from about 300 to about 10,000, and (2) ethylene sulfide in a weight ratio of 1 of (1) to 0.5 to 1.5 of (2).

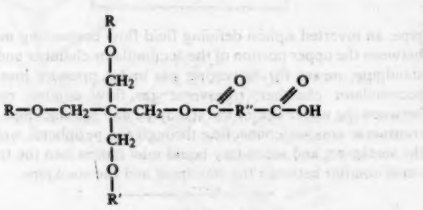
4,187,257

RADIATION CURABLE VINYL ESTER RESIN

Robert C. Nielsen, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 18, 1978, Ser. No. 897,311
Int. Cl.[2] C08L *63/00*
U.S. Cl. 525—445 8 Claims

1. A radiation curable composition comprising the terminally unsaturated ester of (1) a polyepoxide or a hydroxyl terminated polyester and (2) a monoester of a substituted pentaerythritol and a dicarboxylic acid, said monoester having the formula



wherein R is individually acrylyl or methacrylyl, R′ is acrylyloxy, methacrylyloxy, hydrogen, a saturated aliphatic group, an unsaturated aliphatic group, or an aromatic group, and R″ is a divalent saturated aliphatic group, a divalent arylene group or an unsaturated aliphatic group of the formula

wherein X is a halogen or an aromatic group.

4,187,258

SEALERLESS PRIMERS

Martin J. Simon, Natrona Heights, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 156,923, Jun. 25, 1971, abandoned, which is a continuation-in-part of Ser. No. 887,333, Dec. 22, 1969, abandoned. This application Apr. 6, 1973, Ser. No. 348,771
Int. Cl.[2] C08L *61/20, 67/00*
U.S. Cl. 525—157 6 Claims

1. A primer composition comprising:

a. an aminoplast curing agent produced from the condensation products of amines or amides with an aldehyde;

b. a saturated resin which is curable with said aminoplast curing agent to form a thermoset polymer and which is a saturated polyester having hydroxyl functionality, a saturated polyether having hydroxyl functionality or a saturated polyurethane having hydroxyl functionality; and

c. a thermoplastic acrylic polymer which

(1) is selected from the group consisting of addition polymers of esters of alpha, beta ethylenically unsaturated acids and interpolymers of esters of alpha, beta ethylenically unsaturated acids with other ethylenically unsaturated compounds,

(2) is essentially non-curable with said aminoplast curing agent, and

(3) after curing of the primer composition, is soluble in solvents in which it was soluble before said curing.

4,187,259

POLYMER BLENDS WITH IMPROVED HYDROLYTIC STABILITY COMPRISING A LINEAR AROMATIC POLYESTER AND A METHACRYLATE CROSS-LINKED ACRYLATE COPOLYMER

Gideon Salee, Williamsville, N.Y., assignor to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Filed Jun. 30, 1978, Ser. No. 920,891
Int. Cl.[2] C08L *67/06*
U.S. Cl. 525—219 32 Claims

1. A thermoplastic polymeric composition comprising in admixture; (a) a linear aromatic polyester of a bisphenol and a dicarboxylic acid and (b) the methacrylate-crosslinked acrylate copolymer recovered from the polymerization process which comprises emulsion-polymerizing a monomer reactant which is predominantly a lower alkyl acrylate monomer in the presence of a small effective amount of a diethylenically unsaturated cross-linking monomer to form a latex of a soft crosslinked lower alkyl acrylate polymer, adding to said latex a monomer reactant which is predominantly a lower alkyl methacrylate monomer and emulsion-polymerizing said lower alkyl methacrylate monomer to form a hard lower alkyl methacrylate polymer, said crosslinked lower alkyl acrylate polymer and said hard lower alkyl methacrylate polymer being produced from the same polymerization reaction mixture micelles.

4,187,260

MASS POLYMERIZATION PROCESS FOR POLYBLENDS

Robert L. Kruse, Springfield, and Gene E. DeJackome, Orange, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 23, 1976, Ser. No. 716,605
Int. Cl.[2] C08F *279/02*
U.S. Cl. 525—263 2 Claims

1. An improved process for the mass polymerizing of a solution comprising a monoalkenyl aromatic monomer having a diene rubber dissolved therein wherein the improvement comprises:

A. dissolving a minor amount of an organic diperoxide initiator in said solution,

B. mass polymerizing said solution at temperatures of from about 80°–180° C., with agitation,

C. forming polymer molecules of said monomers as a matrix phase having dispersed therein a diene rubber phase as rubber particles grafted with and having occluded at least a portion of said polymer molecules, said diperoxide compound being selected such that, during polymerization, said diperoxide compound initiates a higher molecular weight polymer fraction providing said polymer with a broader molecular weight distribution, said organic diperoxide initiator being 2,5,dimethyl-2,5-bis(t-butyl peroxy) hexyne-3.

4,187,261

VINYL AROMATIC POLYMERIZATION PROCESS

Francis J. Slama, Aurora, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed May 23, 1978, Ser. No. 908,839
Int. Cl.[2] C08F *279/02*
U.S. Cl. 525—243 10 Claims

1. In a three-stage, plug flow, continuous, mass polymerization process in which vinyl aromatic polymer is polymerized in

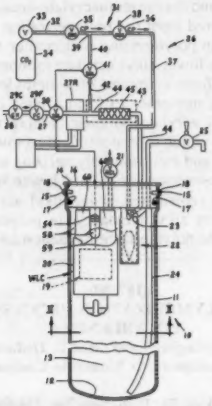
the presence of a rubber with sufficient agitation to disperse rubber particles adequately, the improvement which comprises (a) in the first stage conversion of monomer to polymer is between about 20 to about 55 percent and the temperature is about 120° C. to about 150° C.; (b) in the second stage conversion of monomer to polymer is between about 45 to about 75 percent and the temperature is about 148° C. to about 170° C.; and in the final reactor stage conversion of monomer to polymer is between about 50 to about 89 percent and the temperature is about 160° C. to about 225° C.

4,187,262

CARBONATOR AND LIQUID LEVEL CONTROL

Herman S. Fessler, Coon Rapids, Minn., and Gene A. Tracy, Amery, Wis., assignors to The Cornelius Company, Anoka, Minn.

Filed Apr. 26, 1978, Ser. No. 900,177
Int. Cl.[2] B01F *3/04*
U.S. Cl. 261—50 B **39 Claims**



1. A carbonator, comprising
(a) a pressure vessel for containing therein water and carbon dioxide under pressure;
(b) means for introducing water into said vessel;
(c) means for introducing carbon dioxide into said vessel;
(d) means for controlling the level of water in said pressure vessel, said control means comprising
(1) means for sensing the level of water within the vessel, and
(2) means operative by said sensing means for controlling introduction of water into the vessel; and
(e) a housing within the pressure vessel and enclosing said level sensing means, said housing having
(1) a water chamber within which is said sensing means
(2) a water inlet port to said water chamber, said port being substantially at the level of a desired maximum water level within said vessel,
(3) a water outlet port from said water chamber, said outlet port being substantially below said inlet port, and
(4) means in said outlet port for checking against flow of water into the water chamber through the outlet port.

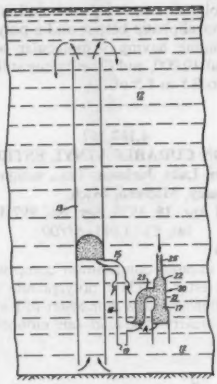
4,187,263

LIQUID CIRCULATING DEVICE

Peter Lipert, Dollard des Ormeaux, Canada, assignor to Aero-Hydraulics Corporation, Dorval, Canada

Filed Jan. 15, 1979, Ser. No. 3,707
Int. Cl.[2] B01F *3/04*
U.S. Cl. 261—77 **12 Claims**

1. A device for creating circulation within a body of liquid, the device comprising a substantially vertically extending stackpipe means designed to be wholly submerged within the liquid, the stackpipe having an upper discharge opening and a lower inlet opening; a large-bubble generator means located adjacent the stackpipe and comprising a gas-accumulator chamber having a peripheral wall, a top wall, and an opening at the chamber bottom; a substantially vertically extending standpipe adjacent the accumulator chamber and the stack-



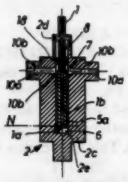
pipe; an inverted siphon defining fluid flow connecting means between the upper portion of the accumulator chamber and the standpipe; means for delivering gas under pressure into the accumulator chamber; transverse gas flow conduit means between the upper end of the standpipe and the stackpipe, the transverse conduit connecting through the peripheral wall of the stackpipe; and secondary liquid inlet means into the transverse conduit between the standpipe and the stackpipe.

4,187,264

CARBURETOR FOR AN INTERNAL COMBUSTION ENGINE

Rudolf Diener, Seefeldstrasse 253, Zürich, Switzerland

Continuation of Ser. No. 680,387, Apr. 26, 1976, abandoned.
This application Jun. 20, 1978, Ser. No. 917,277
Claims priority, application Switzerland, May 9, 1975, 6017/75; Jul. 28, 1975, 9835/75
Int. Cl.[2] F02M *29/02*
U.S. Cl. 261—84 **22 Claims**



1. A carburetor for an internal combustion engine, comprising means defining a fuel chamber, a fuel-infeed conduit cooperating with the fuel chamber, an impeller wheel for rotating the fuel chamber about a lower end of the fuel-infeed conduit, the fuel chamber possessing at least one lateral nozzle for the delivery of fuel into a mixing compartment, a substantially ring-shaped gap provided in the fuel chamber between its inner wall and the fuel-infeed conduit, the fuel chamber including a lower fuel compartment and an upper fuel compartment, said nozzle being disposed in the upper fuel compartment, the fuel-infeed conduit opening into the lower fuel compartment,

the ring-shaped gap flow communicating the lower fuel compartment with the upper fuel compartment, the upper fuel compartment having a ring-shaped air inlet opening which is substantially coaxially arranged with respect to the fuel-infeed conduit, wherein the fuel-infeed conduit has an outlet opening, the ring-shaped gap between the lower fuel compartment and the upper fuel compartment possesses a length amounting to a multiple of its diameters and a gap width which is smaller than the diameter of the outlet opening of the fuel-infeed conduit, and wherein from the upper fuel compartment there leads a respective substantially radial bore to each said lateral fuel-delivery nozzle, and the diameter of the bore is greater than the width of the ring-shaped gap.

4,187,265

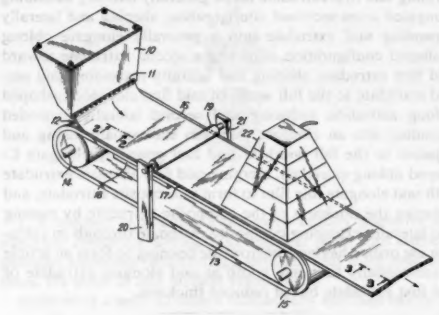
METHOD OF MAKING ORNAMENTAL PLASTIC PRODUCT

Daniel A. Fischler, Dix Hills, N.Y., assignor to Emsig Manufacturing Corp., New York, N.Y.

Continuation of Ser. No. 184,594, Sep. 28, 1971, abandoned, which is a continuation-in-part of Ser. No. 849,429, Aug. 12, 1969, abandoned. This application May 14, 1975, Ser. No. 577,240

Int. Cl.[2] B29D *3/02*

U.S. Cl. 264—22 **2 Claims**



1. The method of manufacturing a formed plastic article having oriented laminar, non-magnetic filler material disposed therein from a batch of liquid resinous material of a type which exhibits an exothermic reaction upon polymerization and which is subject to polymerization responsive to a high speed electron beam, which comprises the steps of introducing said filler material into said resin batch, subjecting said filled resin batch to orienting influences to cause said filler to assume a desired orientation within said batch, terminating application of said influence, and thereafter, while said filler remains oriented, subjecting said batch to a source of high speed electrons in dosage sufficient partially to polymerize the treated portions of said batch throughout the thickness thereof substantially to the "B" stage, thereby to fix the position of said filler in said desired orientation relative to said polymerized material, thereafter forming said material while in the "B" stage, and thereafter completing the cure of the formed material.

4,187,266

PROCESS FOR MAKING A CERAMIC ARTICLE HAVING A DENSE INTEGRAL OUTER BARRIER LAYER AND A HIGH DEGREE OF POROSITY AND CRUSHABILITY CHARACTERISTICS

Charles D. Greskovich, Schenectady; Frederic J. Klug, Amsterdam, and Wayne D. Pasco, Ballston Lake, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 6, 1977, Ser. No. 840,021

Int. Cl.[2] B29H *7/20*

U.S. Cl. 264—43 **8 Claims**

1. A method for increasing the porosity and crushability characteristics of cores and molds for investment casting including the process steps of

(a) preparing a material composition consisting essentially of a reactant fugitive filler material which is one selected from the group consisting of carbon, aluminum, aluminum carbide, aluminum oxycarbide, boron and boron carbide and an alumina-based ceramic compound material having the general formula $MO.NAl_2O_3$ wherein

M is Na_2, Ca, Sr, or Ba

N is from 9 to 11 when M is Na_2, and

N is 6 when M is Ca, Sr, or Ba;

(b) working a portion of the material composition to produce a preform of a predetermined shape;

(c) sintering the preform in a controlled furnace atmosphere to cause a reaction between at least the alumina-based compound material and the reactant fugitive filler material to produce at least one or more suboxides of alumina to produce an alumina ceramic article having a predetermined continuous porosity content and crushability characteristics, and

(d) oxidizing at least a portion of the suboxides of alumina to form a dense integral barrier layer of alumina at the surface.

4,187,267

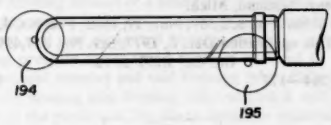
LASER SAFETY SYSTEM

Philip H. Fisher, Lambertville, Mich., and Lawrence D. Ninneman, Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed May 22, 1978, Ser. No. 908,171

Int. Cl.[2] B29C *17/07*

U.S. Cl. 264—40.1 **2 Claims**



1. In a method of making plastic articles by sequentially and repeatedly injection molding the articles about a series of core pins aligned on a linear path and then stripping the articles from the pins, the article being hollow and having a closed end and an open finish end, the steps of:

(a) scanning the core pins, after stripping the plastic articles therefrom, with two laser devices to scan the core pins aligned on the linear path to detect the presence of any plastic residue on any of the core pins, one laser device aligned with the finish end forming portions of the core pins and the other laser device aligned with the closed end forming portions of the core pins;

(b) interrupting the laser beam by the presence of any plastic article residue on any of said pins; and

(c) halting the operation of the method in the event that the laser beam is so interrupted.

4,187,268

METHOD OF MANUFACTURING MOLDED ARTICLES FROM A KNEADABLE MATERIAL, E.G., CLAY

Hendrik Sinnema, Sneek, Netherlands, assignor to Machinefabriek W. Hubert & Co. B.V., Sneek, Netherlands

Filed Jan. 14, 1975, Ser. No. 541,035

Int. Cl.[2] B29C *17/14*

U.S. Cl. 264—151 **5 Claims**

1. A method of making molded articles comprising the steps of:

(a) continuously producing a vertical strand of plastic material, the strand moving continuously along a vertical path,

(b) severing the moving strand at regular intervals to produce a succession of individual pieces of plastic material,

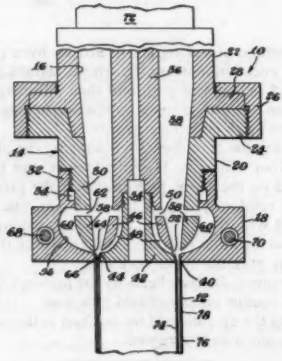
(c) delivering each individual piece to a guide means arranged along said vertical path, and

(d) operating the guide means to throw each individual piece along said vertical path into a mold with sufficient kinetic energy that the piece plastically deforms and fills the mold.

4,187,269
EXTRUSION PROCESS FOR REDUCING MELT FRACTURE

Loyd B. Hutchinson, Denham Springs, and Robert R. Blanchard, Port Allen, both of La., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 632,539, Nov. 17, 1975, Pat. No. 4,080,138. This application Dec. 5, 1977, Ser. No. 857,499
Int. Cl.² B29F *3/10*
U.S. Cl. 264—171 **8 Claims**



1. In a process for preparing extruded articles with substantially reduced melt fracture and improved surface smoothness by flowing a heat plastified stream of an extrudable synthetic resinous thermoplastic material through an extrusion orifice, the steps performed prior thereto of:

(a) physically separating the stream into a central core stream and first and second boundary streams on each side of the core stream;

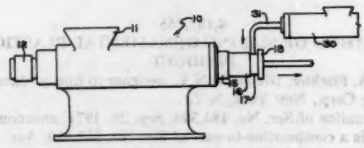
(b) while maintaining physical separation of the core and boundary streams, selectively heating the boundary streams to a temperature substantially hotter than the material in the core stream;

(c) thereafter, recombining the streams prior to expelling the material out the extrusion orifice, said boundary streams being applied as relatively thin hot layers generally uniformly onto the opposite surfaces, respectively, of the core stream.

4,187,270
EXTRUSION APPARATUS

David E. Bartrum, Bay Village, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Division of Ser. No. 818,175, Jul. 22, 1977, Pat. No. 4,118,166. This application May 15, 1978, Ser. No. 905,901
Int. Cl.² B29F *3/10*
U.S. Cl. 264—171 **4 Claims**

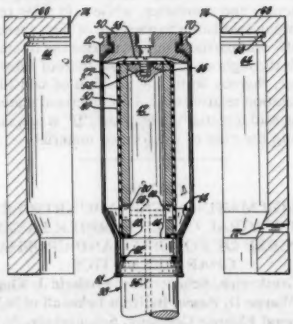


1. A method of forming a composite multilayer sheet of plastic material comprising the steps of, providing a first plasticized extrudate that is cylindrical in cross-sectional shape, forming said first extrudate into a generally laterally extending elongated cross-sectional configuration, shaping and laterally expanding said extrudate into a generally elongate oblong L-shaped configuration, directing a second extrudate toward said first extrudate, shaping and laterally expanding said second extrudate to the full width of said first elongate L-shaped oblong extrudate, reducing said second laterally expanded extrudate into an elongate thin film substantially along and adjacent to the full width of said first generally elongate L-shaped oblong extrudate, merging said first elongate extrudate with said elongate thin film to form a composite extrudate, and reducing the thickness of the composite extrudate by passing said laterally extending composite extrudate through an extrusion die orifice having a narrow die opening to form an article of substantially the same width as said elongate extrudate of said first extrudate but of reduced thickness.

4,187,271
METHOD OF MAKING SAME

J. Albert Rolston, Newark, and Thomas E. Philipps, Granville, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 788,166, Apr. 18, 1977, abandoned. This application Nov. 2, 1978, Ser. No. 957,259
Int. Cl.² B29D *3/02, 23/00*
U.S. Cl. 264—258 **9 Claims**



1. A method for making a casing comprising:

(a) inserting a fibrous preform into a first end of a fibrous sleeve, said preform being configured to interlock said

sleeve with an encircling preformed ring and without said ring form a head for said casing;

(b) expanding an expandible core within said fibrous preform and said sleeve to expand said preform and said sleeve into said ring within a mold;

(c) introducing hardenable resin between said expandible core and inner walls of said mold to impregnate said fibrous sleeve and said fibrous preform;

(d) hardening said resin to form said casing; and removing said casing from said mold.

4,187,272

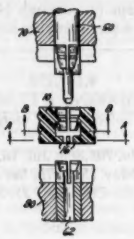
METHOD OF MAKING MOLDED ELECTRICAL CONNECTOR INSERT

Normand C. Bourdon, and Richard Sanford, both of Sidney, N.Y., assignors to The Bendix Corporation, Southfield, Mich.

Division of Ser. No. 728,821, Oct. 1, 1976. This application Dec. 7, 1977, Ser. No. 858,306

Int. Cl.[2] B29F *1/00*; B29G *3/00*

U.S. Cl. 264—318 **1 Claim**



1. A method of molding a one-piece unitary insert for an electrical connector having front and rear faces with internal passages extending therethrough between said front and rear faces, the steps of said method comprising:

positioning a mold to form a substantially enclosed cavity in a shape related to the desired shape of the insert, said mold including members for defining the front and rear connector faces and means for receiving core structures;

locating a plurality of core structures within the cavity of the mold and coupled to the receiving means, each of said core structures having a generally cylindrical body in the shape related to the shape of the passages, said body including cut out portions tapering axially and radially inward at an angle with respect to the axis of the body, said portions shaped to form inwardly tapering fingers within the passages facing in one direction in the molded inert and cut out portions shaped to form shoulders, within the passage upon molding, spaced axially from and radially adjacent to the fingers facing in an opposite direction, each core structure including first and second members with the first element having an axial projection assembled in a central aperture of the second member;

filling the cavity with a material selected from thermo-plastic resins and thermo-setting materials in the liquid state to form a one-piece electrical connector insert having passages with integral fingers and shoulders located within the passages;

cooling the material to its solid state to form an electrical connector insert; and

non-destructively removing the mold and core structures from the insert by displacing the mold and core structures away from the insert in a direction along the axis of the core structures, whereby a one-piece, unitary electrical connector insert having passages extending therethrough with integral fingers and shoulders located within the passage is formed.

4,187,273

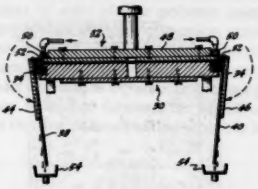
METHOD OF PREFORMING A ONE-PIECE WALL COVERING

Melvin A. Stratis, 138 Beach Dr., Edmonds, Wash. 98020

Division of Ser. No. 698,951, Jun. 23, 1976, Pat. No. 4,052,835. This application Aug. 4, 1977, Ser. No. 821,635

Int. Cl.[2] B29C *17/02, 3/00*

U.S. Cl. 264—322 **2 Claims**



1. A method of preforming a wall covering for three adjacent walls of a bathtub recess by bending a single sheet of standard grade heat softenable plastic laminate material which has a decorative layer on one side and a backing layer on the opposite side, to form two end walls connected to a side wall by two corner regions, including forming each said corner region by:

placing a substantially rectangular suitably sized sheet of said heat softenable plastic laminate material onto a support with a portion thereof which will become an end wall extending outwardly beyond an elongated forming tube which extends along a side of said support and has an outer forming surface of a predetermined radius, and with said decorative layer facing towards and contacting said support and said elongated forming tube;

applying pressure against said sheet of material to press it against said support and said forming tube while simultaneously heating said forming tube so that it will in turn preheat the portion of the plastic laminate material which is in contact with the forming tube only to a preheat temperature below the temperature at which the material becomes soft and can be bent;

then gradually increasing the temperature of the tube from within so that it in turn gradually increases the temperature of the material above said preheat temperature;

applying a steady pressure on the outwardly extending end wall portion of the material as the temperature is rising above said preheat temperature, so that such material will bend about the forming tube as soon as it becomes soft enough to bend, and continuing said bending until the end wall extends at a desired interior angle from the side wall, then discontinuing heating of the material so that the decorative face of the material will not be scorched; and

applying moisture to the formed corner region while said formed corner region is still hot, for the purpose of tempering said formed corner region and substantially setting the shape of said formed corner region.

4,187,274

METHOD FOR FORMING SHEETS HAVING REDUCED SURFACE IMPERFECTIONS

Sigurdur I. Arnason, Fenwick, Mich., assignor to The General Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 801,709, May 31, 1977, abandoned. This application Sep. 26, 1978, Ser. No. 945,930

Int. Cl.[2] B29G *1/00*

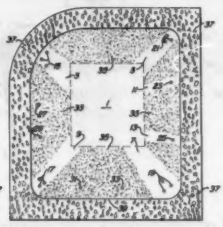
U.S. Cl. 264—325 **1 Claim**

1. In a method for molding a thermosetting liquid having an initial viscosity of from 1,000 to 7×10^7 centipoises at room temperature filled with chopped glass fibers, into a cured sheet of material, which sheet in its final form has one visible surface and one surface which is less visible by:

(a) placing the glass fiber filled thermosetting liquid between two heated dies; and

(b) bringing the heated dies toward each other to cause the glass fiber filled thermosetting liquid to flow and fill the cavity formed by the dies and then set, wherein the improvement comprises:

a rougher surface on the die forming the less visible surface of the sheet than the surface of the die forming the more visible surface, wherein the rougher surface is rough



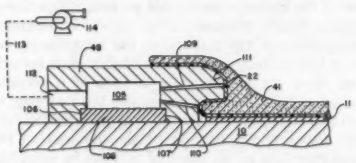
enough to retard the flow of the compound more than the flow is retarded on the corresponding die surface forming the more visible surface, the rougher surface being rough enough to improve the paintability of the sheet produced but not so rough so as to impart a rough finish to the sheet after painting, the rougher surface being formed by the initial casting of the die surface or subsequent removal of material from the die surface by abrasion, etching, electric arc or plasma treatment.

4,187,275

METHOD AND APPARATUS FOR PRODUCING SHAPED GLASS FIBER REINFORCED CEMENTITIOUS ARTICLES

Albert J. Bracalielly, Mars; Glenn E. Kautz; Robert G. Lindner, both of Sewickley, all of Pa., and Bernard H. Davis, Stoney Creek, Canada, assignors to H. H. Robertson Company, Pittsburgh, Pa.

Filed Jun. 14, 1974, Ser. No. 479,428
Int. Cl.[2] B32B *13/08, 13/12*
U.S. Cl. 264—511 **11 Claims**



1. A method for continuously forming glass fiber reinforced gypsum products comprising:

(1) shaping a continuous water impervious formable sheet to a pre-selected trough-like profile and delivering the said formable sheet in the said pre-selected trough-like profile into a slurry deposition station;

(2) depositing on the said formable sheet in the said slurry deposition station a ribbon comprising

2 to 8 parts by weight of glass fibers having an average length in the range of 0.5 to 4.0 inches;

100 parts by weight gypsum hemi-hydrate;

22 to 45 parts by weight water;

(3) delivering the said formable sheet with the said ribbon thereupon from the said slurry deposition station and into a ribbon compaction station;

(4) compacting the said ribbon against the said formable sheet in the said compaction station while maintaining the said formable sheet in a pre-established trough-like profile;

(5) delivering the compacted ribbon and formable sheet to a setting station and maintaining the said formable sheet in the said pre-established trough-like profile until the said ribbon has hardened;

(6) thereafter cutting the said hardened ribbon transversely into lengthwise segments having the said pre-established trough-like profile;

(7) carrying out steps (2) through (6) without deliberately removing liquid water from the said ribbon.

7. The method for forming glass fiber reinforced gypsum articles which comprises:

(1) depositing on a water impervious formable sheet a layer of aqueous slurry of gypsum hemi-hydrate;

(2) thereafter depositing on the said layer a mixture of (a) glass fibers having a random orientation and an average length in the range of 0.5 to 4.0 inches, and (b) aqueous slurry of gypsum hemi-hydrate;

(3) wherein the said mixture constitutes a ribbon containing 2 to 8 parts by weight of glass fibers 100 parts by weight gypsum hemi-hydrate and 22 to 45 parts by weight water;

(4) compacting the said ribbon and recovering a hardened article;

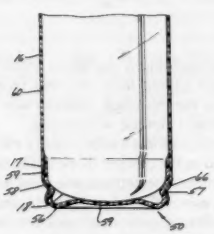
(5) carrying out steps (1) through (4) without deliberately removing liquid water from the said ribbon.

4,187,276

METHOD OF MAKING A PLASTIC PACKAGE

Stephen W. Amberg, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 705,868, Jul. 16, 1976, abandoned. This application May 15, 1978, Ser. No. 905,686
Int. Cl.[2] B29C *27/24*
U.S. Cl. 264—515 **6 Claims**



1. A method of producing a package having a bottle substantially solely securely attached to a bottle supporting base with a heat shrunk label, said method comprising:

(a) extruding a tube of plastic, stretching said tube both radially and longitudinally to biaxially orient the tube, the extent of stretch and the degree of orientation being greater longitudinally than radially, forming a decorated sleeve blank from the tube, fabricating the blank into a tubular sleeve label in which that portion of the original stretched tube which was stretched longitudinally extends circumferentially of the tubular sleeve label,

(b) loosely positioning an uprightly unstable bottle having a vertical axis and a continuously arcuate bottom on a bottle supporting base having a flat support bottom,

(c) encircling externally exposed peripheral surfaces only of said bottle and base including the peripheral line of juncture therebetween within the heat shrinkable predecorated tubular sleeve label, said sleeve label having a high heat shrinkage in the circumferential direction of said label and a low heat shrinkage in the axial direction of said label,

(d) securely and integrally attaching said base to said loosely positioned bottle with said sleeve label by heating said sleeve label for a time and at a temperature sufficient to peripherally shrink said sleeve label into snug, encircling engagement with said external peripheral surfaces and

insufficient to axially shrink the label beyond the confines of said base so as to produce said package, said heating being insufficient to cause any substantial deformation of said bottle, while effecting minimal distortion of said tubular sleeve label axially of said bottle, so that the package is supported on a horizontal surface by the uncovered base support bottom depending beneath said label.

4,187,277

PROCESS OF INHIBITING CORROSION WITH QUATERNARIES OF HALOGEN DERIVATIVES OF ALKYNOXYMETHYL AMINES

Patrick M. Quinlan, Webster Groves, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 556,331, Mar. 7, 1975, abandoned. This application Nov. 3, 1978, Ser. No. 957,616

Int. Cl.[2] **C23F** *11/04, 11/08, 11/14;* **C23G** *1/06*

U.S. Cl. 422—16 **8 Claims**

1. A process of inhibiting corrosion of metals and alloys in an aqueous system which comprises adding to such system a corrosion inhibiting amount of a quaternary selected from quaternaries of halo alkynoxymethyl amines having one to two quaternary nitrogen atoms to each of which are attached up to two halogen derivatives of alkynoxymethyl moieties of the formula $XC{\equiv}CR''OCH_2$—where R'' is alkylidene and X is halogen, the groups directly attached to the quaternary nitrogen atoms in the said quaternary amines being said halo alkynoxymethyl groups and being R and R' groups when there is but one quaternary nitrogen atom present per molecule and being said halo alkynoxymethyl groups and being R and Z groups when there are two quaternary nitrogen atoms present per molecule, the Z groups constituting bridging groups linking the two quaternary nitrogen atoms, the R groups being monovalent hydrocarbon, hydroxy substituted alkyl or furfuryl groups, the R' groups being monovalent hydrocarbon of up to 30 carbon atoms and the Z groups being divalent alkylene, alkenylene, alkynylene, alkaralkylene, or alkylenether groups, the counter anions balancing the positive charge on the quaternary nitrogen being halide anions.

4,187,278

POLYMERIZATION PROCESS

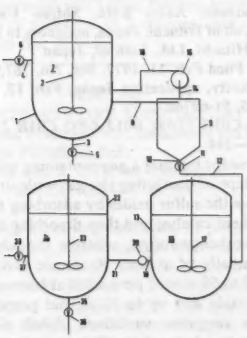
Michael L. Clifford, Welwyn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Apr. 12, 1976, Ser. No. 676,342

Claims priority, application United Kingdom, Apr. 18, 1975, 16064/75

Int. Cl.[2] **B01J** *1/00;* **C08L** *23/00*

U.S. Cl. 422—132 **5 Claims**



1. A polymerisation apparatus comprising a first polymerisation vessel, a separation vessel, a second polymerisation vessel, outlet means in said first polymerisation vessel, inlet means in said separation vessel, connecting means from said outlet means to the inlet means of said separation vessel, the inlet means of said separation vessel being connected only to said connecting means whereby a liquid phase consisting essentially of a solid olefine polymer and a liquid olefine monomeric phase is withdrawn from the first polymerisation vessel and this liquid phase is the only material passed into the separation vessel, means adjusted to withdraw, from the separation vessel, a concentrated mixture of solid olefine polymer and the liquid olefine monomeric phase, said concentrated mixture having an increased content of solid olefine polymer compared to the liquid phase introduced into the separation vessel, means for passing the concentrated mixture to the second polymerisation vessel and means adjusted to maintain the second polymerisation vessel under conditions of temperature and pressure such that the olefine monomer forming the liquid olefine monomeric phase in the first polymerisation vessel, is in the gaseous phase.

4,187,279

DEVICE FOR RECOVERING SODIUM CHEMICALS FROM GREEN LIQUOR AND FLUE GASES

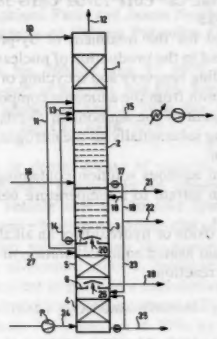
Pertti K. Rimpi, Tampere, Finland, assignor to OY Tampella AB, Tampere, Finland

Filed Sep. 1, 1978, Ser. No. 938,944

Claims priority, application Finland, Sep. 5, 1977, 772626

Int. Cl.[2] **B01J** *10/00;* **C01B** *17/16;* **D21C** *11/06, 11/12*

U.S. Cl. 422—185 **3 Claims**



1. In a device for recovering chemicals from flue gases and water solution of a smelt obtained from burning waste liquor of sodium based pulping processes, which device comprises: a precarbonation reactor; a H_2S stripping column; a carbonation reactor; a washing tower for flue gases, a cooling tower for washed flue gases; means for feeding flue gases into the washing tower, from the washing tower into the cooling tower, and from the cooling tower into the carbonation reactor and the precarbonation reactor, and for feeding flue gases out of the precarbonation reactor and the carbonation reactor; means for feeding green liquor into the precarbonation reactor, for leading solution containing sodium bisulfide from the precarbonation reactor into the stripping column, and for discharging a solution containing sodium carbonate and sodium bicarbonate from the stripping column; means for feeding transfer gas into the stripping column and for discharging gaseous hydrogen sulphide from the stripping column; means for feeding cooling water into the cooling tower and for discharging warm water therefrom; means for feeding the solution containing sodium carbonate and sodium bicarbonate into the carbonation reactor and thereafter into the stripping column; means for feeding the solution containing sodium carbonate and sodium bicarbonate discharged from said stripping column into the washing tower and for discharging a sodium sulfite solution therefrom; the improvement: that at least the carbonation reactor, the cooling tower and the washing tower are arranged on top of each other

in the same column which is provided with trays so that the means for feeding flue gases from the washing tower into the cooling tower and further into the carbonation reactor are openings made in the trays to allow the washed flue gases to rise from the washing tower into the cooling tower above it and further into the carbonation reactor above the cooling tower; that the means for feeding flue gases into the washing tower comprise a common blower for blowing flue gases through washing tower, cooling tower, carbonation reactor, and precarbonation reactor, and that the means for discharging the solution containing sodium carbonate and sodium bicarbonate from the stripping column are connected with means for feeding this solution directly into the carbonation reactor and the washing tower.

4,187,280
PROCESS FOR RECOVERING USEABLE PRODUCTS FROM BY-PRODUCT AMMONIUM NITRATE FORMED IN THE MANUFACTURE OF NUCLEAR REACTOR FUELS OR BREEDER MATERIALS

Paul Morschl, and Erich Zimmer, both of Jülich, Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung, Jülich, Fed. Rep. of Germany

Filed Apr. 13, 1977, Ser. No. 787,151

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1976, 2617968

Int. Cl.[2] C01F *15/00;* **C01G** *56/00*

U.S. Cl. 423—15 **4 Claims**

1. A method for the treatment of by-product ammonium nitrate produced in the production of nuclear fuels and breeder materials enabling recovery and recycling of nitrogen in usable form derived both from the ammonia component and from the nitrate component of the ammonium nitrate and thereby usefully recovering substantially all the nitrogen thereof, comprising the steps of:

a. heating an aqueous solution containing said by-product ammonium nitrate to a temperature between 90° C. and 110° C.;

b. adding an oxide or hydroxide of an alkali or alkaline earth metal to said heated aqueous solution to initiate one of the following reactions:

$$2NH_4NO_3 + Me(OH)_2 \rightarrow Me(NO_3)_2 + 2NH_3 + 2H_2O,$$

$$2NH_4NO_3 + MeO \rightarrow Me(NO_3)_2 + 2NH_3 + H_2O,$$

$$NH_4NO_3 + Me(OH) \rightarrow MeNO_3 + NH_3 + H_2O,$$

$$2NH_4NO_3 + Me_2O \rightarrow 2MeNO_3 + 2NH_3 + 2H_2O,$$

where Me represents the alkali or alkaline earth metal;

c. recovering the ammonia gas vaporized during the above reactions;

d. drying the metal nitrate solution obtained in step b to recover the metal nitrate in solid form;

e. heating the metal nitrate to decompose the compound into the respective metal oxides and oxides of nitrogen according to the equations:

$$Me(NO_3)_2 \rightarrow MeO + 2NO_2 + \tfrac{1}{2}O_2,$$

$$2MeNO_3 \rightarrow Me_2O + 2NO_2 + \tfrac{1}{2}O_2,$$

$$\tfrac{1}{2}O_2 + 2NO_2 \rightarrow N_2O_5;$$

f. treating the oxides of nitrogen to produce nitric acid;

g. utilizing the metal oxides formed in step e as an oxide additive in step b to form metal nitrate and ammonia;

h. dissolving the ammonia recovered in step c in water to form ammonia hydroxide solution;

i. adding a compound selected from $UO_2(NO_3)_2$ and $Th(NO_3)_4$ to the solution formed in step h to produce $(NH_4)_2U_2O_7$ and $Th(OH_4)$, respectively, according to the following reactions:

$$2UO_2(NO_3)_2 + 6NH_4OH \rightarrow (NH_4)_2U_2O_7 + 4NH_4NO_3 + 3H_2O,$$

$$Th(NO_3)_4 + 4NH_4OH \rightarrow Th(OH)_4 + 4NH_4NO_3;$$

j. utilizing the nitric acid formed in step f for dissolving an oxide of a fissionable metal from irradiated nuclear fuel.

4,187,281
HYDROMETALLURGICAL RECOVERY OF COBALT AND NICKEL

John C. Stauter, Streamwood, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Aug. 7, 1978, Ser. No. 931,804

Int. Cl.[2] C22B *23/00*

U.S. Cl. 423—150 **11 Claims**

1. In a hydrometallurgical process for the recovery of nickel and cobalt metal values from a source containing the same which comprises:

(a) roasting said source in a reducing atmosphere at a temperature in the range of from about 550° to about 900° C. in contact with a roast additive selected from the group consisting of solid sulfur in the concentration of about 0.01 to about 5% by weight of said source, gaseous sulfur compounds in the concentration of about 0.01 to about 10% by weight of said source, hydrogen halide in the concentration of about 0.01 to about 10% by weight of said source, and combinations thereof;

(b) cooling said roasted material in the absence of air until said reduced source obtains a temperature below about 95° C. and extracting the same below about 95° C. in the presence of an oxygen-containing gas with a basic leaching agent at a pH sufficiently high to prevent dissolution of high amounts of iron from said source; and

(c) recovering said desired nickel and cobalt metal values, the improvement which comprises utilizing ammoniacal ammonium chloride as said basic leaching agent of step (b).

4,187,282
PROCESS FOR TREATING A WASTE GAS CONTAINING SULFUR OXIDES

Shimpei Matsuda; Akira Kato; Shigeo Uno, and Fumito Nakajima, all of Hitachi, Japan, assignors to Babcock-Hitachi K.K. and Hitachi, Ltd., both of, Japan

Filed Feb. 11, 1977, Ser. No. 767,962

Claims priority, application Japan, Feb. 12, 1976, 51-13174; Jun. 16, 1976, 51-69760

Int. Cl.[2] C01B *17/00;* **B01J** *8/00;* **C01B** *21/00, 17/02*

U.S. Cl. 423—244 **18 Claims**

1. A process for treating a gas containing sulfur oxides comprising the steps of contacting the gas with an adsorbent catalyst to remove the sulfur oxides by adsorbing the sulfur oxides on the adsorbent catalyst and then desorbing the sulfur oxides from the adsorbent catalyst, wherein the adsorbent catalyst consists essentially of at least 50 atomic percent of titanium oxide, from 2 to 50 atomic percent of at least one of iron oxide and copper oxide and up to 10 atomic percent of oxides of molybdenum, tungsten, vanadium, cobalt and nickel, said adsorbent catalyst being free of aluminum oxide, said adsorbent catalyst being prepared by molding a coprecipitate of titanium hydroxide and at least one of iron hydroxide and copper hydroxide and calcining the moldings at a temperature below 600° C. under an oxidizing atmosphere.

4,187,283

METHOD FOR IMPROVING ORGANIC CATION-CONTAINING ZEOLITES

George T. Kokotailo, and Stephen Sawruk, both of Woodbury, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 15, 1979, Ser. No. 3,326
Int. Cl.[2] C01B *33/28*; B01J *29/06*
U.S. Cl. 423—328 13 Claims

1. A method for improving the adsorptive properties of an organic cation-containing crystalline zeolite which comprises (1) heating said zeolite at a temperature within the approximate range of 150° to 600° C. for a period of time sufficient to decompose organic material contained in the zeolite without effecting coking thereof, (2) contacting the resulting product with an aqueous solution of a monovalent metal salt at a temperature between about 50° and about 120° C. for a period of time sufficient to expel at least a major portion of the decomposition products of said organic material and (3) calcining the product so obtained at a temperature of at least about 500° C. but below a temperature at which crystallinity of said zeolite is adversely affected.

4,187,284

SKELETAL IMAGING KIT UTILIZING TRIETHYLENE TETRAMINE HEXA (METHYLENE PHOSPHONIC ACID)

Richard E. Rolleston, Dollard des Ormeaux, and Jacques A. Nadeau, Ville St. Laurent, both of Canada, assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 3, 1977, Ser. No. 838,709
Int. Cl.[2] A61K *43/00*
U.S. Cl. 424—1 5 Claims

1. A kit for the preparation of an injectable solution incorporating Technetium 99m which comprises in a single sterile container a freeze-dried mixture of triethylene tetramine hexa (methylene phosphonic acid) or a water-soluble salt thereof and a water-soluble tin salt.

5. The lead salt of triethylene tetramine hexa (methylene phosphonic acid).

4,187,285

MICROAGGREGATED ALBUMIN

Marion Meeks, East Windsor, and R. K. Narra, North Brunswick, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Dec. 16, 1977, Ser. No. 861,231
Int. Cl.[2] A61K *29/00*, *43/00*; G01N *33/16*
U.S. Cl. 424—1 6 Claims

1. A composition comprising microaggregated denatured albumin having stannous ions bound thereto, having a particle size in the range of about 0.1 to 3 microns, said composition being substantially free of buffer.

4,187,286

CONTRACEPTIVE SUPPOSITORY

Bertram J. Marcus, Freehold, N.J., assignor to G&W Laboratories, Inc., South Plainfield, N.J.

Filed Jan. 2, 1979, Ser. No. 960,077
Int. Cl.[2] A61K *9/02*, *9/46*
U.S. Cl. 424—44 10 Claims

1. A suppository consisting essentially of polyethylene glycol, a thickening agent, alginic acid, an effervescent agent and a medicinally active ingredient, the polyethylene glycol being present in a proportion of about 61.2–74.8 percent by weight, the thickening agent being present in a proportion of about 0.9–1.1 percent by weight, the effervescent agent being present in a proportion of about 10.8–13.2 percent by weight, the alginic acid being present in a proportion of about 13.5–16.5 percent by weight, and the medicinally active ingredients being present in a proportion of about 3.6–4.4 percent by weight.

4,187,287

WARM TWO TONE FLAVORED DENTIFRICE

Ronald S. Schreiber, Highland Park, and Joseph R. Principe, East Brunswick, both of N.J., assignors to Colgate Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 827,295, Aug. 24, 1977, Pat. No. 4,132,771. This application Sep. 29, 1978, Ser. No. 947,305
The portion of the term of this patent subsequent to Jan. 2, 1996, has been disclaimed.
Int. Cl.[2] A61K *7/16*
U.S. Cl. 424—49 9 Claims

1. An anhydrous heat releasing dentifrice which generates heat in the mouth and effects a two tone flavor change in the oral cavity comprising an abrasive system consisting essentially of a finely divided anhydrous synthetic zeolite having an appreciable heat of hydration and capable of being reversibly dehydrated in amounts of about 10–50% by weight, and about 5–20% of a finely divided anhydrous dental abrasive to decrease the abrasivity and regulate the degree of heat generated by said dentifrice, about 0.1 to 5% by weight of at least one flavoring agent, and about 20 to 75% of an anhydrous liquid vehicle.

4,187,288

MODIFIED ABRASIVE SYSTEM FOR DENTIFRICES

Martin Cordon, Highland Park, and James Norfleet, Plainfield, both of N.J., assignors to Colgate Palmolive Company, New York, N.Y.

Division of Ser. No. 759,617, Jan. 17, 1977, which is a continuation-in-part of Ser. No. 544,618, Jan. 28, 1975, abandoned. This application Oct. 4, 1978, Ser. No. 948,606
Int. Cl.[2] A61K *7/16*
U.S. Cl. 424—49 8 Claims

1. A toothpaste or dental cream of superior cleaning and polishing characteristics comprising an aqueous humectant containing dental vehicle and an abrasive system having at least one hard abrasive having a particle size of about 1 to 15 microns in diameter selected from the group consisting of calcined alumina, zirconium silicate, feldspar, pumice, and ZrO_2, and in an amount to provide a radioactive enamel abrasion value to the dentifrice of above about 400 and present in an amount of at least 7.5% and up to 20% by weight of the dentifrice, and including an additional softer dental abrasive having a particle size of 2–40 microns and in an amount of about 10–50% by weight, said dental vehicle containing a non-toxic zinc compound in an amount to provide at least about 0.0065% zinc to the dentifrice, said zinc compound selected from the group consisting of zinc chloride, zinc sulfate, zinc acetate, zinc nitrate, and zinc oxide in an amount of about 0.01–2.0% by weight of the dentifrice, so as to reduce the enamel abrasion of the dentifrice.

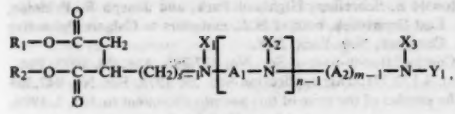
4,187,289

SOFTENING AGENTS CONTAINING DIESTER/AMINE ADDUCTS AND QUATERNARY AMMONIUM SALTS, VALUABLE FOR USE AS AFTER-RINSE SOFTENERS AND AFTER-SHAMPOO HAIR CONDITIONERS

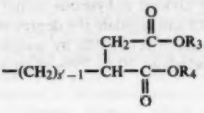
Claude Eckhardt, Riedisheim, France, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 21, 1977, Ser. No. 853,067
Claims priority, application Switzerland, Dec. 3, 1976, 15255/76
Int. Cl.[2] A61K *7/06*, *7/08*
U.S. Cl. 424—70 16 Claims

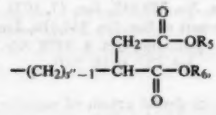
1. A softening agent which contains (a) a diester/amine adduct of the formula



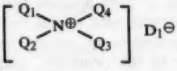
in which R_1 and R_2 each are alkyl or alkenyl of 12 to 22 carbon atoms, m and s each are 1 or 2 and n is 1, 2, 3 or 4, A_1 and A_2 each are alkylene of 2 or 3 carbon atoms or 2-nydroxy-n-propylene, X_1, X_2 and X_3 each are hydrogen, alkyl of 1 to 4 carbon atoms, hydroxyalkyl or hydroxy-halogenalkyl of 2 to 4 carbon atoms or are a radical of the formula



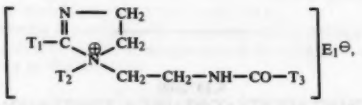
in which R_3 and R_4 each are alkyl or alkenyl of 12 to 22 carbon atoms and s' is 1 or 2, with the proviso that, if n is 3 or 4, the individual radicals X_2 are the same or different, and Y_1 is hydrogen, alkyl of 1 to 4 carbon atoms or a radical of the formula



in which R_5 and R_6 each are alkyl or alkenyl of 12 to 22 carbon atoms and s'' is 1 or 2, and the ratio of the diester groups to the nitrogen atoms is 1:1 and the adduct of the indicated formula is in the form of the free base, acid salt or quaternary ammonium salt; and (b) a quaternary ammonium salt selected from the group consisting of the formula



and of the formula



in which Q_1 and T_2 each are hydrogen, alkyl or alkenyl of at most 8 carbon atoms, Q_2 is alkyl or alkenyl of at most 8 carbon atoms, Q_3, T_1 and T_3 each are alkyl or alkenyl or alkenyl of 8 to 30 carbon atoms, Q_4 is alkyl or alkenyl of at most 30 carbon atoms, and $D_1\ominus$ and $E_1\ominus$ each are anion which imparts water-solubility or water-dispersibility to the ammonium salts, the weight ratio of diester/amine adduct to ammonium salts being 9.5:0.5 to 1:9.

16. A method of conditioning human hair which comprises treating hair with an after-shampoo hair conditioner containing a softening agent according to claim **1**.

4,187,290

CARRIER AND DISPERSAL MECHANISM FOR A MICROORGANIC LARVICIDE

Leonard J. Goldberg, Albany, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 888,083, Mar. 20, 1978. This application Apr. 18, 1979, Ser. No. 30,961

Int. Cl.[2] **A01N** *15/00*

U.S. Cl. 424—93 **6 Claims**

1. A carrier for dispersing spores of a microbial entomotoxin employed as an oral bacterial larvicide comprising:

(a) dioxane;

(b) oleaginous liquid, said liquid being dissolved in said dioxane;

(c) microbial entomotoxin admixed with said solution of dioxane and said oleaginous liquid such that said oleaginous liquid nucleates about said spores upon introduction of water to admixture.

4,187,291

COSMETIC COMPOSITION FOR THE SKIN

Janine Marissal, Monte Carlo, Monaco, assignor to Biotherm, Monte Carlo, Monaco

Filed May 6, 1977, Ser. No. 794,646

Claims priority, application Luxembourg, May 7, 1976, 74900

Int. Cl.[2] **A61K** *37/48, 35/78*

U.S. Cl. 424—94 **11 Claims**

1. A composition for treating cellulitis or folds of fat comprising in a cosmetically acceptable vehicle, as active components (i)–(iii) wherein

(i) is an iodinated vegetable oil containing about 37 to 42 percent combined iodine,

(ii) is a mucopolysaccharidase selected from the group consisting of thiomucase and hyaluronidase, and

(iii) is escine.

4,187,292

ANTIBIOTICS PRODUCED FROM THE MICROORGANISM NOCARDICE

Eiji Higashide, Takarazuka; Mitsuko Asai, Osaka, and Toru Hasegawa, Kawanishi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jul. 12, 1977, Ser. No. 815,050

Claims priority, application Japan, Mar. 31, 1977, 52-37168; Apr. 1, 1977, 52-37884

Int. Cl.[2] **H01K** *35/00*

U.S. Cl. 424—122 **2 Claims**

1. Antibiotics selected from C-14919 E-1 or E-2, which have the following properties:

(a) Antibiotic C-14919 E-1

(i) m.p. 187° C. (decomp.)

(ii) Appearance: yellow crystals (needles or prisms)

(iii) Solubility: Insoluble in: petroleum ether, hexane, water Sparingly soluble in: diethyl ether, benzene Soluble in: ethyl acetate, chloroform, butanol, methyl isobutyl ketone, ethanol, acetone, methanol Readily soluble in: dimethylsulfoxide

(iv) Acid, neutral or basic: a neutral substance

(v) Elemental analysis: C, 65.31; 65.05; 64.85 (%) H, 7.71; 7.58; 7.62 N, 5.01; 4.95; 5.01 O, 21.37; 22.83; 22.45

(vi) Empirical formula: $C_{30\text{-}32}H_{42\text{-}48}N_2O_{8\text{-}9}$

(vii) Ultraviolet absorption spectrum: λ_{max}^{MeOH}: N-HCl(9:1)(nm)($E_1^{1\%}$ cm): 274(455), 240(sh.), 397(43) λ_{max}^{MeOH}(nm)($E_1^{1\%}$ cm): 274(455), 240(sh.), 397(43) λ_{max}^{MeOH}: N-NAOH(9:1)(nm)($E_1^{1\%}$ cm): 236(585), 265(500), 550(56)

(viii) Infrared absorption spectrum (KBr): Dominant peaks (cm^{-1}) at: 3430, 3340, 2950, 2910, 1740, 1692, 1660, 1645, 1605, 1500, 1375, 1315, 1120, 1100, 1085, 1060, 1025

(ix) Specific rotation: $[\alpha]_D^{25°} + 350° \pm 10°$ (c=0.5, methanol)

(x) Color reactions Negative ninhydrin, Erhlich, peptide and 1% iron chloride-1% ferricyanide (1:1) reactions

(b) Antibiotic C-14919 E-2

(i) m.p. 148° C. (decomp.)

(ii) Appearance: Pale yellow crystals (needles or prisms)

(iii) Solubility: Insoluble in: petroleum ether, hexane Sparingly soluble in: diethyl ether, benzene, chloroform, water Soluble in: ethyl acetate, butanol, methyl isobutyl ketone, ethanol, acetone, methanol Readily soluble: dimethylsulfoxide

(iv) Acid, neutral or basic: a neutral substance

(v) Elemental analysis: C, 62.32; 62.07 (%) H, 8.58; 8.43 N, 4.82; 4.78 O, 20.81: 20.81

(vi) Empirical formula: $C_{30\text{-}32}H_{44\text{-}50}N_2O_{8\text{-}9}\cdot xH_2O$

(vii) Ultraviolet absorption spectrum: λ_{max}^{MeOH}: N-HCl(9:1)(nm)($E_1^{1\%}$ cm): 225(295), 308(sh.) λ_{max}-$_{MeOH}$(nm)($E_1^{1\%}$ cm): 238(550), 255(290), 308(sh.) λ_{max}-$_{MeOH}$: N-NaOH(nm)($E_1^{1\%}$ cm): 236(505), 265(420), 550(50)

(viii) Infrared absorption spectrum (KBr): Dominant peaks (cm^{-1}) at: 3480, 3250, 2980, 1685, 1625, 1598, 1472, 1390, 1370, 1315, 1207, 1090, 1065, 1042, 1030

(ix) Specific rotation: $[\alpha]_D^{25°} + 62° \pm 4°$ (c=0.5, methanol)

(x) Color reactions Negative ninhydrin, Erhlich and peptide reactions; Positive 1% iron chloride-1% ferricyanide (1:1) reaction (blue).

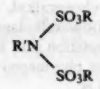
4,187,293

STABILIZATION OF SOLUTIONS CONTAINING ACTIVE CHLORINE

G. Douglas Nelson, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Oct. 25, 1978, Ser. No. 954,700
Int. Cl.[2] A01N *11/02*
U.S. Cl. 424—149 **9 Claims**

1. A method of stabilizing an aqueous solution containing active chlorine as a sanitizing agent against the loss of active chlorine upon exosure to ultraviolet light or by contact with aluminum, copper or iron which comprises adding to the solution a stabilizing amount of a compound represented by the structure



wherein each R is individually hydrogen, an alkali metal or alkaline earth metal and R′ is hydrogen, chlorine, an alkali metal or alkaline earth metal.

4,187,294

METHOD FOR PRODUCING EGGS CONTAINING A HIGH AMOUNT OF IODINATED AMINO ACIDS

Tadashi Ishikawa, Sagamihara, and Hiroshi Kamimae, Yokohama, both of Japan, assignors to Nihon Nousan Kougyou Co., Ltd., Yokohama, Japan

Filed Jul. 6, 1978, Ser. No. 922,581
Int. Cl.[2] A61K *33/18*
U.S. Cl. 424—150 **1 Claim**

1. A method for increasing the iodine content of the eggs of egg-laying birds in the form of iodinated amino acids in an amount of 7 ppm or more, said eggs being useful in treating hypercholesterolemia, which comprises providing a feed composition containing calcium iodate in the amount of 230–2000 mg per kg of feed, and feeding said feed composition to egg-laying birds.

4,187,295

ORGANIC COMPOUNDS

Janos Pless, Basel, and Edmond Sandrin, Riehen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed Sep. 6, 1978, Ser. No. 940,051
Claims priority, application Switzerland, Sep. 7, 1977, 10939/77; Nov. 17, 1977, 14058/77; May 19, 1978, 5468/77
Int. Cl.[2] A61K *37/00;* **C07C** *103/52*
U.S. Cl. 424—177 **35 Claims**

1. A compound of the formula

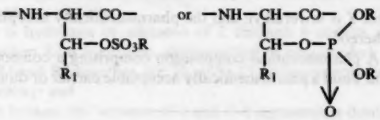
A—B—C—D—E I

wherein

A is H—Trp, H—MeTrp, H—Trp(5—OH) or H—MeTrp-(5—OH),

B is Ala,

C is Ser, Thr, Ala, Gly, Val, a residue of formula



wherein

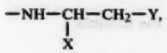
R is hydrogen, alkyl of 1 to 4 carbon atoms, or an alkali metal or an alkaline earth metal

and

R_1 is hydrogen or methyl,

D is Gly or Sar,

E is a residue



wherein

X and Y independently signify COZ or CH_2OH,

Z is OH, OR_2, NH_2, NHR_3 or NR_3R_4, and

each of

R_2, R_3 and R_4 independently signifies alkyl of 1 to 4 carbon atoms

whereby the residues A, B, C and E can have the L-, D- or D, L configuration, or a pharmaceutically acceptable salt or complex form thereof.

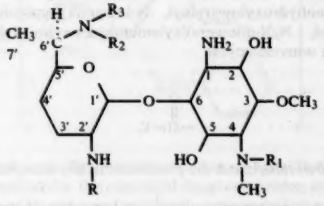
4,187,296

2-N-ACYL AND ALKYL 6-EPI-FORTIMICIN B AND DERIVATIVES

John S. Tadanier, and Jerry R. Martin, both of Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Dec. 21, 1977, Ser. No. 863,007
Int. Cl.[2] A61K *31/71;* **C07H** *15/22*
U.S. Cl. 424—180 **10 Claims**

1. 2′-N-substituted, 6′-epi fortimicins B represented by the formula:



wherein: R is acyl, hydroxyacyl, aminoacyl, N-monoloweralk-

ylaminoacyl, N,N-diloweralkylaminoacyl, hydroxy-substituted aminoacyl, an amino acid residue, loweralkyl, aminoloweralkyl, hydroxyloweralkyl, N-loweralkylaminoloweralkyl, N,N-diloweralkylaminoloweralkyl, aminohydroxyloweralkyl, N-loweralkylaminohydroxyloweralkyl, or N,N-diloweralkylaminohydroxyloweralkyl; and R_1 is acyl, aminoacyl, N-monoloweralkylaminoacyl, N,N-diloweralkylaminoacyl, hydroxyacyl, N,N-diloweralkylaminoacyl, hydroxy-substituted aminoacyl, an amino acid residue, loweralkyl, aminoloweralkyl, hydroxyloweralkyl, N-loweralkylaminoloweralkyl, N,N-diloweralkylaminoloweralkyl, aminohydroxyloweralkyl, N-loweralkylaminohydroxyloweralkyl, N,N-diloweralkylaminohydroxyloweralkyl or hydrogen R_2 is lower alkyl; R_3 is hydrogen or lower alkyl and wherein acyl is represented by the formula

wherein Y is loweralkyl; and the pharmaceutically acceptable salts thereof.

10. A pharmaceutical composition comprising a compound of claim 1 and a pharmaceutically acceptable carrier or diluent.

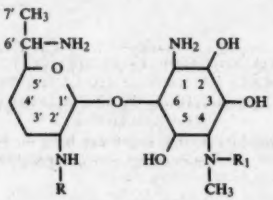
4,187,297

3-DE-O-METHYL-2-N-ACYL AND ALKYL FORTIMICINS A AND B

Jerry R. Martin; John S. Tadanier, both of Waukegan, and Paulette Collum, Zion, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Dec. 21, 1977, Ser. No. 863,014
Int. Cl.[2] A61K *31/71;* **C07H** *15/22*
U.S. Cl. 424—180 **10 Claims**

1. A compound of the formula:



wherein; R is acyl, aminoacyl, N-monoloweralkylaminoacyl, N,N-diloweralylaminoacyl, hydroxy-substituted aminoacyl, a chiral amino acid residue, loweralkyl, aminoloweralkyl, hydroxyacyl, an alkyl, N-loweralkylaminoloweralkyl, N,N-diloweralkylaminoloweralkyl, aminohydroxyloweralkyl, N-loweralkylaminohydroxyloweralkyl, or N,N-diloweralkylaminohydroxyloweralkyl; and R_1 is acyl, aminoacyl, N-monoloweralkylaminoacyl, N,N-diloweralkylaminoacyl, hydroxy-substituted aminoacyl, an amino acid residue, hydroxyacyl, loweralkyl, aminoloweralkyl, hydroxyloweralkyl, N-loweralkylaminoloweralkyl, N,N-diloweralkylminoloweralkyl, aminohydroxyloweralkyl, N-loweralkylaminohydroxyloweralkyl, N,N-diloweralllkylaminohydroxyloweralkyl or hydrogen wherein acyl is

Y being loweralkyl; and the pharmaceutically acceptable salts thereof.

10. A pharmaceutical composition comprising a compound of claim 1 and a pharmaceutically acceptable carrier or diluent.

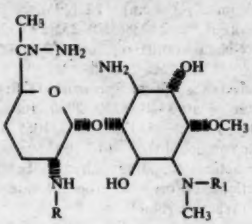
4,187,298

2'N-ACYL AND ALKYL FORTIMICIN B AND DERIVATIVES, 4,2'-N,N'DIACYL AND DIALKYL FORTIMICIN B DERIVATIVES 4-N-ACYL-2'-N-ALKYL AND 4-N-ALKYL-2'-N-ACYL FORTIMICIN B DERIVATIVES

Jerry R. Martin; John S. Tadanier, both of Waukegan, and Paulette Collum, Zion, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Dec. 21, 1977, Ser. No. 863,012
Int. Cl.[2] A61K *31/71;* **C07H** *15/22*
U.S. Cl. 424—180 **21 Claims**

1. A fortimicin B derivative selected from the group consisting of 2'N-acyl and alkyl fortimicin B and fortimicin B derivatives, 4,2'-N,N'-diacyl and dialkyl derivatives, 4-N-acyl-2'-N-alkyl and 4-N-alkyl-2'-N-acyl fortimicin B derivatives represented by the formula:



wherein: R is acyl, aminoacyl, N-monoloweralkylaminoacyl, N,N-diloweralkylaminoacyl, hydroxy-substituted aminoacyl, hydroxyacyl, an amino acid residue selected from the group consisting of L, D or DL glycyl, alanyl, sarcosyl, tyrosyl, phenylalanyl, methionyl, seryl, lysyl, asparginyl, isoleucyl, leucyl, histidyl, threonyl, aspartyl, asparaginyl, valyl, prolyl, glutaminyl, tryptophanyl, and glutamyl, loweralkyl, aminoloweralkyl, hydroxyloweralkyl, N-loweralkylaminoloweralkyl, N,N-diloweralkylaminoloweralkyl, aminohydroxyloweralkyl, N-loweralkylaminohydroxyloweralkyl, or N,N-diloweralkylaminohydroxyloweralkyl; and R_1 is acyl, aminoacyl, N-monoloweralkylaminoacyl, N,N-diloweralkylaminoacyl, hydroxy-substituted aminoacyl, hydroxyacyl an amino acid residue, loweralkyl, aminoloweralkyl, hydroxyloweralkyl, N-loweralkylaminoloweralkyl, N,N-diloweralkylaminoloweralkyl, aminohydroxyloweralkyl, N-loweralkylaminohydroxyloweralkyl, N,N-diloweralkylaminohydroxyloweralkyl or hydrogen; with the limitation that R_1 cannot be hydrogen when R is glycyl and the pharmaceutically acceptable salts thereof, and wherein acyl is

R_4 being loweralkyl.

21. A pharmaceutical composition comprising a compound of claim 1 and a pharmaceutically acceptable carrier or diluent.

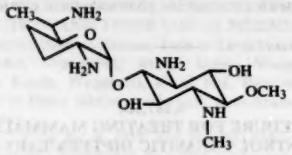
4,187,299

FORTIMICIN E

Gerald G. Post, Kenosha, Wis., assignor to Abbott Laboratories, Chicago, Ill.

Filed Dec. 21, 1977, Ser. No. 863,016
Int. Cl.[2] A61K *31/71;* **C07H** *15/22*
U.S. Cl. 424—181 **3 Claims**

1. Fortimicin E, represented by the formula



or a pharmaceutically acceptable salt thereof.

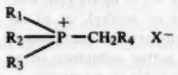
3. A pharmaceutical composition comprising a therapeutically effective amount of fortimicin E or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier or diluent.

4,187,300
USE OF PHOSPHONIUM SALTS IN TREATMENT OF AFRICAN TRYPANOSOMIASIS

Kenneth E. Kinnamon, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 20, 1978, Ser. No. 971,124
Int. Cl.[2] A61K *31/66*
U.S. Cl. 424—198 **7 Claims**

1. A method for treating African trypanosomiasis which comprises administering, either parenterally or perorally and using a pharmaceutically acceptable vehicle, a therapeutically effective amount of a phosphonium compound of the formula:



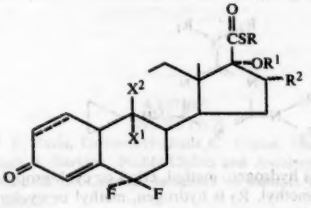
wherein R_1 through R_4 each represent phenyl or substituted phenyl and X represents halogen; and wherein the phosphonium compound is administered to a subject infected with a trypanosomal parasite.

4,187,301
17 BETA-THIOCARBOXYLIC ACID ESTERS OF 6 ALPHA, 6 BETA-DIFLUORO-3-OXOANDROST-4-ENES

John A. Edwards, Los Altos, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Apr. 5, 1978, Ser. No. 893,389
Int. Cl.[2] A61K *31/58;* **C07J** *71/00*
U.S. Cl. 424—241 **21 Claims**

1. A compund chosen from those represented by the formula



(I)

wherein

X^1 is hydrogen, fluoro, chloro or bromo;

X^2 is =C=O or

or is

when X^1 is chloro;

R is alkyl of 1 through 6 carbon atoms or phenyl or benzyl optionally substituted with one substituent on the phenyl ring chosen from the group consisting of alkyl of 1 through 4 carbon atoms, alkoxy of 1 through 4 carbon atoms and halo;

R^1 is hydrogen or alkanoyl of 2 through 6 carbon atoms when R^2 is hydrogen, alpha-methyl or beta-methyl;

OR^1 and R^2 together are 16 alpha,17 alpha-isopropylidenedioxy; and

the broken line between C-1 and C-2 represents a double or a single bond.

12. An anti-inflammatory pharmaceutical composition which comprises about 0.001% by weight to about 10% by weight of a compound of claim 1 in combination with about 90% by weight to about 99.999% by weight of suitable pharmaceutical excipients.

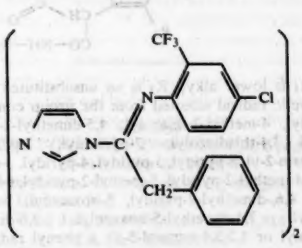
4,187,302
1-[N-(4-CHLORO-2-TRIFLUOROMETHYLPHENYL)-PHENYLACETIMIDOYL]IMIDAZOLE, METAL COMPLEXES THEREOF, AND FUNGICIDAL COMPOSITIONS

Katsuyata Ikura, Ninomiya; Kiyoshi Katsuura, and Masaaki Kataoka, both of Ohiso, all of Japan, assignors to Nippon Soda Company, Ltd., Tokyo, Japan

Filed Mar. 14, 1978, Ser. No. 886,358
Claims priority, application Japan, Mar. 31, 1977, 52-35236
Int. Cl.[2] A01N *9/22, 11/04;* **C07D** *233/56*
U.S. Cl. 424—245 **12 Claims**

1. 1-[N-(4-chloro-2-trifluoromethylphenyl)-phenylacetimidoyl]imidazole

2. A metal complex of the formula



wherein A is Cu(II) or Zn(II) and B is cl_2 or $(CH_3COO)_2$.

9. A method for the control of fungi comprising applying to the locus to be protected an effective amount of the compound of claim 1.

4,187,303

THIAZINE DERIVATIVES

Otto Hromatka; Dieter Binder, both of Vienna, Austria; Paul Zeller, Allschwil, and Rudolf Pfister, Basel, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

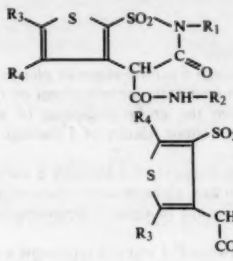
Filed Aug. 15, 1978, Ser. No. 933,682

Claims priority, application Luxembourg, Aug. 22, 1977, 78009

Int. Cl.[2] C07D *279/02*; A61K *31/54*

U.S. Cl. 424—246 **12 Claims**

1. A compound of the formula



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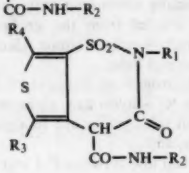

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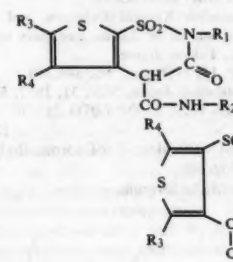
wherein R_1 is lower alkyl, R_2 is an unsubstituted aromatic heterocyclic radical selected from the group consisting of 2-thiazolyl, 4-methyl-2-thiazolyl, 4,5-dimethyl-2-thiazolyl, 5-methyl-1,3,4-thiadiazolyl, 2-pyrazinyl, 2-pyrimidinyl, 1,2,4-triazin-2-yl, 2-pyridyl, 3-pyridyl, 4-pyridyl, 3-methyl-2-pyridyl, 4-methyl-2-pyridyl, 5-methyl-2-pyridyl, 6-methyl-2-pyridyl, 4,6,-dimethyl-2-pyridyl, 5-isoxazolyl, 5-methyl-3-isoxazolyl, 3,4-dimethyl-5-isoxazolyl, 2,6-dimethyl-4-pyrimidinyl or 1,2,3,4-tetrazol-5-yl; a phenyl radical, or a phenyl or benzyl group optionally substituted by halogen, hydroxy, lower alkyl, trifluoromethyl or lower alkoxy, and R_3 and R_4, individually, are hydrogen or lower alkyl,

its tautomer, a salt thereof with a pharmaceutically acceptable base and, when R_2 is the residue of a basic heterocycle, a salt thereof with a pharmaceutically accetpable strong acid.

12. A pharmaceutical preparation comprising a compound of the formula



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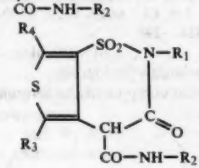


I''

wherein R_1 is lower alkyl, R_2 is an unsubstituted aromatic heterocyclic radical selected from the group consisting of 2-thiazolyl, 4-methyl-2-thiazolyl, 4,5-dimethyl-2-thiazolyl, 5-methyl-1,3,4-thiadiazolyl, 2-pyrazinyl, 2-pyrimidinyl, 1,2,4-triazin-2-yl, 2-pyridyl, 3-pyridyl, 4-pyridyl, 3-methyl-2-pyridyl, 4-methyl-2-pyridyl, 5-methyl-2-pyridyl, 6-methyl-2-pyridyl, 4,6,-dimethyl-2-pyridyl, 5-isoxazolyl, 5-methyl-3-isoxazolyl, 3,4-dimethyl-5-isoxazolyl, 2,6-dimethyl-4-pyrimidinyl or 1,2,3,4-tetrazol-5-yl; a phenyl radical, or a phenyl or benzyl group optionally substituted by halogen, hydroxy, lower alkyl, trifluoromethyl or lower alkoxy, and R_3 and R_4, individually, are hydrogen or lower alkyl,

its tautomer, a salt thereof with a pharmaceutically acceptable base and, when R_2 is the residue of a basic heterocycle, a salt thereof with a pharmaceutically acceptable strong acid, in association with a compatible pharmaceutical carrier material.

4,187,304

PROCEDURE FOR TREATING MAMMALS TO CONTROL PARASITIC DIPTERA LARVAE

Rolf Immler, Arisdorf, and Hans Bouvard, Ollon, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

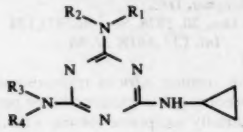
Filed Feb. 7, 1979, Ser. No. 10,277

Claims priority, application Switzerland, Feb. 17, 1978, 1761/78

Int. Cl.[2] A61K *31/53*

U.S. Cl. 424—249 **4 Claims**

1. A procedure for treating domestic animals and productive livestock belonging to the class of Mammalia for systemic control of tissue-parasitic insect larvae of the order of Diptera, which comprises parenteral or transcutaneous administration, to the animals to be treated, of an effective dose of an active substance of the general formula I



(I)

in which R_1 is hydrogen, methyl, ethyl or cyclopropyl, R_2 is hydrogen or methyl, R_3 is hydrogen, methyl or cyclopropyl and R_4 is hydrogen or methyl, or of an acid addition salt thereof which is non-toxic to mammals or of a composition which contains the active substance or an acid addition salt thereof which is non-toxic to mammals.

4,187,305

PROCEDURE FOR TREATING MAMMALS TO CONTROL PARASITIC DIPTERA LARVAE

Rolf Immler, Arisdorf, and Hans Bouvard, Ollon, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

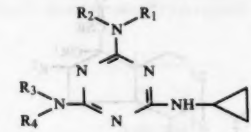
Filed Feb. 7, 1979, Ser. No. 10,279

Claims priority, application Switzerland, Feb. 17, 1978, 1762/78

Int. Cl.[2] A61K *31/53*

U.S. Cl. 424—249 **5 Claims**

1. A procedure for treating domestic animals and productive livestock belonging to the class of Mammalia for systemic control of tissue-parasitic insect larvae of the order of Diptera, which comprises peroral administration, to the aminals to be treated, of an effective dose of an active substance of the general formula I



(I)

in which R_1 is hydrogen, methyl, ethyl or cyclopropyl, R_2 is hydrogen or methyl, R_3 is hydrogen, methyl or cyclopropyl and R_4 is hydrogen or methyl, or of an acid addition salt thereof which is non-toxic to mammals or of a composition which contains the active substance or an acid addition salt thereof which is non-toxic to mammals.

4,187,306

BENZODIAZEPINE-DIONES, A PROCESS FOR THEIR PRODUCTION AND THEIR USE AS MEDICAMENTS

Karl H. Mayer; Helmut Heitzer, both of Leverkusen; Friedrich Hoffmeister, Wuppertal; Arend Heise, Wuppertal, and Stanislav Kazda, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

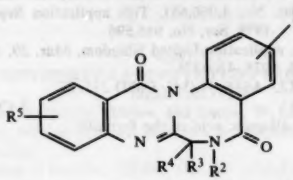
Filed Jul. 6, 1978, Ser. No. 922,419

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1977, 2733681; Dec. 30, 1977, 2758875

Int. Cl.[2] C07D *471/04*

U.S. Cl. 424—251 21 Claims

1. A compound which is a 6,7-Dihydro-5H, 13H-quinazolin [3,2-a][1,4]benzodiazepine-5,13-dione of the formula (I) or its pharmacologically acceptable acid-addition salts:



(I)

in which

R^1 and R^5 are the same or different and each represents 0, 1, 2, 3 or 4 substituents which are the same or different and each of which is alkyl, hydroxyl, acyloxy, alkoxy, nitro, amino, alkylamino, dialkylamino, acylamino, acylalkylamino, alkoxycarbonylamino, halogen, trifluoromethyl, cyano, carboxyl, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, aminosulphonyl, alkylaminosulphonyl, dialkylaminosulphonyl, alkylaminocarbonylamino or dialkylaminocarbonylamino, each of said alkyl, alkoxy and acyl radicals having 1 to 4 carbon atoms

R^2 is hydrogen, alkyl having from 1 to 6 carbon atoms and optionally substituted by phenyl, pyridyl, halogen, alkoxy or dialkylamino, each of the alkyl and alkoxy moieties containing from 1 to 4 carbon atoms, or an alkoxycarbonyl group having from 1 to 4 carbon atoms in the alkoxy moiety and

R^3 and R^4 are the same or different and each is hydrogen, alkyl having from 1 to 4 carbon atoms or phenyl.

18. A method of treating the central nervous system in warm-blooded animals which comprises administering to the said animals an amount effective for providing central nervous system action of an active compound according to claim 1 either alone or in admixture with a diluent or in the form of a medicament.

4,187,307

DIURETICS

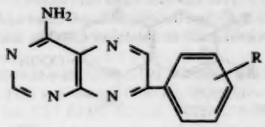
Gerard Y. Paris, Duvernay; Denis G. Cimon, Montreal-Nord; Dilbagh S. Bariana, Pointe-Claire, and Anthony Fung, Pierrefonds, all of Canada, assignors to Abbott Laboratories, Chicago, Ill.

Filed Oct. 16, 1978, Ser. No. 951,935

Int. Cl.[2] A61K *31/505*; C07D *475/06*

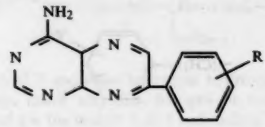
U.S. Cl. 424—251 21 Claims

1. A compound of the formula



wherein R is hydrogen, dimethylamino, m-methyl or p-methyl.

15. A medicinal composition for increasing urine excretion from a warm-blooded animal containing a diuretically effective amount of a compound of the formula



wherein R is H, Me_2N, m-Me or p-Me together with a pharmaceutically acceptable diluent or carrier.

4,187,308

PHARMACEUTICAL COMPOSITION WITH ANTI-BRONCHOSPASMODIC AND ANTI-TUSSIVE ACTIVITY

Jose S. Franzone, and Teresio Tamietto, both of Turin, Italy, assignors to Istituto Biologico Chemioterapico "ABC" S.p.A., Torino, Italy

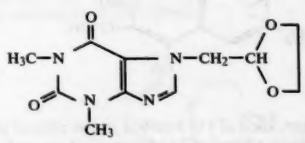
Filed Oct. 12, 1978, Ser. No. 950,749

Claims priority, application Italy, Apr. 6, 1978, 22019 A/78

Int. Cl.[2] A61K *31/52*

U.S. Cl. 424—253 7 Claims

1. A pharmaceutical composition with anti-bronchospasmodic and anti-tussive activity in the form of an aerosol for pulmonary administration containing an effective amount of the compound of formula I



(I)

together with at least one pharmaceutically acceptable carrier or diluent.

4,187,309

4-HYDROXY-2-QUINOLINONE-3-CARBOXYLIC ACIDS AND SALTS THEREOF

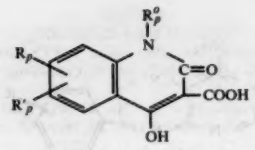
Goetz E. Hardtmann, Morristown, N.J., assignor to Sandoz, Inc., East Hanover, N.J.

Filed Jun. 20, 1977, Ser. No. 807,914

Int. Cl.[2] A61K *31/47*

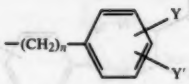
U.S. Cl. 424—258 64 Claims

1. The method of treating allergic conditions due to histamine release comprising administering to a mammal in need of such treatment an allergy treating effective amount of a compound having in free acid form the formula:



wherein

R_p^o is hydrogen, alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon atoms, alkynyl of 3 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, cycloalkylalkyl in which the cycloalkyl is of 3 to 6 carbon atoms and the alkyl portion is of 1 to 2 carbon atoms, or



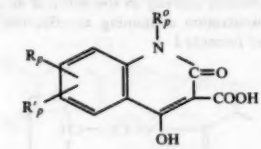
n—is 0 or 1,

Y and Y'—are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms, trifluoromethyl or nitro, with the proviso that only one of Y and Y' can be from the group consisting of nitro and trifluoromethyl, and

R_p and R_p'—are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, nitro or trifluoromethyl, or R_p and R_p' together form 6,7-methylenedioxy, with the proviso that only one of R_p and R_p' can be from the group consisting of nitro and trifluoromethyl,

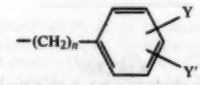
with the further proviso that the unsaturation in any alkenyl or alkynyl is on other than the alpha carbon atom; or a mono- or di-salt form thereof in which the salt forming cation is a pharmaceutically acceptable cation.

33. A pharmaceutical composition comprising in unit dosage form a pharmaceutically acceptable carrier and an amount effective to relieve allergic conditions due to histamine release of a compound having in free acid form the formula:



wherein

R_p^o is hydrogen, alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon atoms, alkynyl of 3 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, cycloalkylalkyl in which the cycloalkyl is of 3 to 6 carbon atoms and the alkyl portion is of 1 to 2 carbon atoms, or



n—is 0 to 1,

Y and Y'—are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms, trifluoromethyl or nitro, with the proviso that only one of Y and Y' can be from the group consisting of nitro and trifluoromethyl, and

R_p and R_p'—are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, nitro or trifluoromethyl, or R_p and R_p' together form 6,7-methylenedioxy, with the proviso that only one of R_p and R_p' can be from the group consisting of nitro and trifluoromethyl, with the further proviso that the unsaturation in any alkenyl or alkynyl is on other than the alpha carbon atom; or a mono- or di-salt form thereof in which the salt forming cation is a pharmaceutically acceptable cation.

4,187,310
1,2-DIHYDRO-2-OXOQUINOL-4-YLACETIC ACID DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS

David R. Brittain; Edward D. Brown; Walter Hepworth, all of Macclesfield, and Gilbert J. Stacey, Cheadle, all of England, assignors to Imperial Chemical Industries Limited, London, England

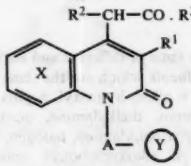
Division of Ser. No. 832,613, Sep. 12, 1977, U.S. Pat. No. 4,138,490, which is a continuation-in-part of Ser. No. 662,685, Mar. 1, 1976, Pat. No. 4,066,651. This application Sep. 25, 1978, Ser. No. 945,596

Claims priority, application United Kingdom, Mar. 20, 1975, 11644/75; Oct. 14, 1975, 4204375

Int. Cl.[2] **A61K** *31/545;* **C07D** *215/22*

U.S. Cl. 424—258 **8 Claims**

1. A quinolone alkanoic acid of the formula:



wherein A is a direct bond, or a C_{1-4}-alkylene or C_{2-4}-alkenylene group; R^1 is hydrogen or a halogen atom or a C_{1-4}-alkyl group; R^2 is hydrogen; R^3 is a hydroxy, amino, hydroxylamino, C_{1-6}-alkoxy or phenoxy group; and wherein the benzene ring X may be unsubstituted or substituted by 1 or 2 substituents selected from halogen atoms, C_{1-6}-alkyl, C_{1-4}-alkoxy, C_{1-4}-alkylthio, trifluoromethyl, C_{1-3}-alkylenedioxy, nitro, amino, C_{1-4}-alkylamino, di-(C_{1-4}-alkyl)amino, C_{2-4}-alkanoylamino, benzyloxy and hallogenobenzyloxy groups; and wherein the ring Y is an unsubstituted phenyl group or a phenyl group substituted by 1, 2 or 3 substituents selected from halogen atoms, C_{1-6}-alkyl, C_{1-4}-alkoxy, C_{1-4}-allkylthio, C_{1-4}-alkylamino, di-(C_{1-4}-alkyl)amino, nitro, cyano, trifluoromethyl, C_{2-8}-alkoxyalkyl, phenyl and halogenophenyl groups; or wherein the ring Y is a naphthyl, halogenonaphthyl, furyl, pyridyl, or thienyl group; or a pharmaceutically acceptable salt thereof.

4. A pharmaceutical aldose reductase inhibiting composition which comprises a compound of formula I or a pharmaceutically acceptable salt thereof as claimed in claim 1 in pharmaceutically-acceptable form.

6. A method of inhibiting the enzyme aldose reductase in a warm-blooded animal requiring such treatment which comprises internally administering to the said animal an effective amount of a compound of formula I or a pharmaceutically acceptable salt thereof as claimed in claim 1.

4,187,311
3-ARYLOXY-1-CARBOALKOXYETHYLPYRIDINIUM COMPOUNDS AND COMPOSITIONS

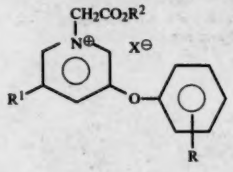
Donald E. Butler, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Nov. 13, 1978, Ser. No. 960,251

Int. Cl.[2] **C07D** *213/65;* **A61K** *31/44*

U.S. Cl. 424—263 **9 Claims**

1. A compound of the formula



where R is hydrogen, fluorine or chlorine; R^1 is hydrogen or lower alkyl, R^2 is lower alkyl and $X^{\ominus}$ is a pharmaceutically-acceptable anion.

8. A pharmaceutical composition comprising an antisenility or induced amnesia reversing effective amount of a compound of claim 1 and a pharmaceutical carrier.

4,187,312
3-HYDROXY-4,4-DIMETHYL-5-PYRROLIDONE DERIVATIVES

Frederick Cassidy, Harlow, and Antony W. Lake, Saffron Walden, both of England, assignors to Beecham Group Limited, England

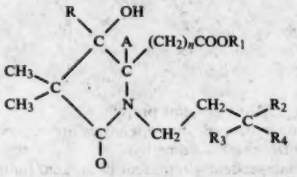
Division of Ser. No. 732,989, Oct. 15, 1976, Pat. No. 4,136,190. This application Oct. 24, 1978, Ser. No. 954,188

Claims priority, application United Kingdom, Oct. 25, 1975, 43989/75; May 22, 1976, 21279/76

Int. Cl.[2] C07D *207/26*; A61K *31/40*

U.S. Cl. 424—274 **33 Claims**

1. A compound of the formula



wherein

n is an integer having a value of from 4 to 8;

R is hydrogen or alkyl of 1 to 4 carbon atoms;

R_1 is hydrogen, or CO_2R_1 is an ester group in which R_1 contains from 1 to 12 carbon atoms;

R_3 is hydroxy, alkanoyloxy of 1 to 4 carbon atoms or benzyloxy;

each of R_2 and R_4 when taken separately is hydrogen, alkyl of 1 to 9 carbon atoms, cycloalkyl of 5 to 8 carbon atoms, cycloalkylalkyl of 5 to 8 carbon atoms in the cycloalkyl moiety and 1 to 6 carbon atoms in the alkyl moiety, phenyl, phenylalkyl of 1 to 6 carbon atoms in the alkyl moiety, naphthyl, naphthylalkyl of 1 to 6 carbon atoms in the alkyl moiety, said phenyl and naphthyl groups being unsubstituted or substituted by one or more members selected from the group consisting of halo, trifluoromethyl, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms and nitro; or R_2 and R_4 when taken with the carbon atom to which they are joined are cycloalkyl of 5 to 8 carbon atoms;

A is hydrogen or methyl; or an alkali metal, alkaline earth metal, ammonium or substituted ammonium salt of said compound in which R_1 is hydrogen.

32. A pharmaceutical composition having antigastric secretion activity, anti-hypertensive activity, bronchodilator activity, and platelet aggregation inhibition activity comprising an effective amount of a compound according to claim 1 and a pharmaceutically acceptable carrier.

4,187,313
2-AMINOETHYL-1,4-BENZODIOXANS

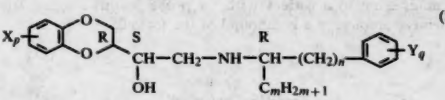
Heinz W. Gschwend, New Providence, and Charles F. Huebner, Chatam, both of N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 873,457, Jan. 30, 1978, abandoned. This application Oct. 10, 1978, Ser. No. 949,583

Int. Cl.[2] A61K *31/335*; C07D *319/08*

U.S. Cl. 424—278 **7 Claims**

1. Specific stereoisomers of erythro-2-(2-aralkylamino-1-hydroxyethyl)-1,4-benzodioxans corresponding to Formula I



(I)

wherein each of X and Y are hydrogen, hydroxy, lower alkyl, lower alkoxy, lower alkylthio, halogen or trifluoromethyl; each of p and q is the integer 1 or 2 and each of m and n is an integer from 1 to 4; or pharmaceutically acceptable acid addition salts thereof.

6. An antihypertensive pharmaceutical composition comprising a hypotensively effective amount of a compound as claimed in claim 1, together with a pharmaceutical excipient.

7. A method of treating hypertension and cardiac conditions in mammals, which comprises administering to them enterally or parenterally a composition as claimed in claim 6.

4,187,314
SUBSTITUTED FURYL-2,3,4,5-TETRAHYDRO-1H-3-BENZAZEPINE COMPOUNDS AND PHARMACEUTICAL USE

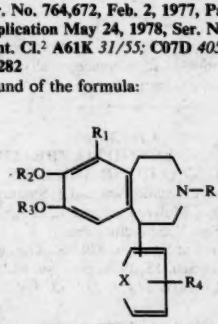
Kenneth G. Holden, Haddonfield, N.J., and Nelson C. Yim, Philadelphia, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 764,672, Feb. 2, 1977, Pat. No. 4,111,957. This application May 24, 1978, Ser. No. 909,073

Int. Cl.[2] A61K *31/55*; C07D *405/04*

U.S. Cl. 424—282 **7 Claims**

1. A compound of the formula:



in which:

R is hydrogen, benzyl, phenethyl, lower alkanoyl of 1-5 carbons, lower alkyl of 1-5 carbons, hydroxyethyl or lower alkenyl of 3-5 carbons;

R_1 is hydrogen, halo, trifluoromethyl, methylthio, trifluoromethylthio, methyl or methoxy;

R_2 and R_3 are hydrogen;

R_4 is hydrogen, halo, cyanomethyl or methyl; and

X is —O—; and the pharmaceutically acceptable nontoxic salts thereof.

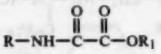
7. A pharmaceutical composition having dopaminergic activity comprising an effective therefor and nontoxic quantity of a compound of claim 1 and a dosage unit carrier therefor.

4,187,315
N-ALKYL(AND CYCLOALKYL)OXAMIC ACID AND DERIVATIVES AS INHIBITORS OF GLYCOLIC ACID OXIDASE

Edward J. Cragoe, Jr., Lansdale; Frederick C. Novello, Berwyn, and Walfred S. Saari, Lansdale, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 11, 1978, Ser. No. 950,510
Int. Cl.[2] A61K *31/215, 31/195*
U.S. Cl. 424—305 **2 Claims**

1. A method of treating or preventing the formation of calcium oxalate kidney or bladder stones, which comprises administering to a patient with, or prone to this disease, an effective amount of a compound of the formula



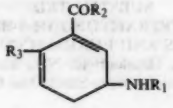
wherein R is alkyl or from 6–12 carbon atoms or cycloalkyl of from 6–12 carbon atoms, R_1 is hydrogen or lower alkyl from 1–6 carbon atoms or a pharmaceutically acceptable salt thereof.

4,187,316
SUBSTITUTED 1,5-CYCLOHEXADIENE CARBOXYLIC ACID DERIVATIVES

Brian W. Metcalf, Strasbourg, and Michel Jung, Illkirch, both of France, assignors to Merrell Toraude et Compagnie, Strasbourg, France

Filed Jan. 12, 1978, Ser. No. 868,860
Int. Cl.[2] A61K *31/215;* **C07C** *61/22*
U.S. Cl. 424—305 **9 Claims**

1. A compound of the formula



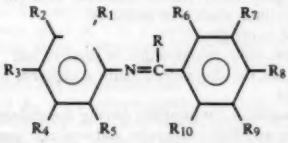
wherein R_1 is hydrogen; R_2 is hydroxy, or a straight or branched alkoxy group of from 1 to 8 carbon atoms; R_3 is hydrogen or bromine; and pharmaceutically acceptable salts and individual optical isomers thereof.

4,187,317
SUNSCREEN AND ERYTHEMA TREATING WITH N-BENZYLIDENE ANILENES

George W. Nuss, Jr., Lansdale; Norman J. Santora, Roslyn, and George H. Douglas, Malvern, all of Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.

Continuation-in-part of Ser. No. 839,960, Oct. 6, 1977. This application Sep. 15, 1978, Ser. No. 942,868
Int. Cl.[2] A61K *31/24, 31/135, 31/195*
U.S. Cl. 424—309 **31 Claims**

1. A method of protecting human skin from erythema caused by ultraviolet and visible light radiation and for inhibiting the formation of prostaglandins in humans resulting from the radiation which comprise applying to the skin an effective amount of a compound of the formula:



(I)

where:
R is hydrogen or alkyl;
R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8, R_9, and R_{10} may be the same or different and are
hydrogen,
alkyl,
nitro,
amino,
halologeralkoxy,
halologeralkyl,
halo,
lowergalkoxy,
hydroxy,
carboxy and
carbalkoxy; and
R_3 and R_8 may also be cycloalkyl, cycloalkenyl and aryl.

4,187,318
RODENTICIDAL N-ALKYLDIPHENYLAMINES

Barry A. Dreikorn, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 706,022, Jul. 21, 1976, abandoned, which is a continuation-in-part of Ser. No. 617,115, Sep. 26, 1975, abandoned. This application Dec. 12, 1977, Ser. No. 859,492
Int. Cl.[2] A01N *9/20;* **C07C** *87/54*
U.S. Cl. 424—330 **79 Claims**

1. A compound of the formula:

wherein
R represents methyl, ethyl or propyl;
R^1 represents hydrogen, fluoro, chloro, bromo, iodo, cyano, methyl, nitro or trifluoromethyl;
R^2 and R^5 independently represent hydrogen, fluoro, chloro, bromo, nitro, methyl or trifluoromethyl, provided that no more than one of R^2 and R^5 represents nitro;
R^3 and R^4 independently represent hydrogen, methyl, fluoro, chloro, bromo or trifluoromethyl;
provided that
(a) no more than one of R^1, R^2, R^3, R^4 and R^5 represents methyl, except that R^3 and R^4 may both represent methyl;
(b) when R^1, R^2, R^3, R^4 or R^5 represents methyl or fluoro, two or three of R^1, R^2 and R^5 represent chloro or bromo;
(c) no more than one of R^1, R^2, R^3, R^4 and R^5 represents trifluoromethyl, except that R^3 and R^4 may both represent trifluoromethyl;
(d) when R^2 or R^5 represents trifluoromethyl, R^1 represents chloro or bromo;
(e) when one and only one of R^3 and R^4 represents trifluoromethyl, two or three of R^1, R^2 and R^5 represent chloro or bromo;
(f) no more than four of R^1, R^2, R^3, R^4 and R^5 represent hydrogen;
(g) two fluorine atoms are not adjacent to each other;
(h) when R^2 or R^5 represents nitro, R^1 represents chloro, bromo or nitro;
(i) when one of R^1, R^2, R^3, R^4 and R^5 represents trifluoromethyl, none of R^1, R^2, R^3, R^4 and R^5 represents fluoro or methyl.

48. A method of reducing a population of rats or mice which comprises supplying to a locus frequented by the rats or mice a rodenticidally-effective amount of a rodenticidal composition comprising an inert carrier and a rodenticidally-effective concentration of a compound of claim **1**.

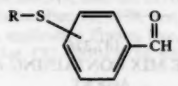
4,187,319

SUBSTITUTED BENZALDEHYDE HYPOLIPIDEMIC AGENTS

Thomas R. Blohm, Maderia; J. Martin Grisar, and Roger A. Parker, both of Cincinnati, all of Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

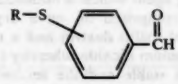
Continuation of Ser. No. 619,304, Oct. 3, 1975, Pat. No. 4,066,788. This application Jun. 2, 1977, Ser. No. 802,853
The portion of the term of this patent subsequent to Jan. 3, 1995, has been disclaimed.
Int. Cl.[2] A61K *31/11*; C07C *47/48*
U.S. Cl. 424—333 5 Claims

1. A pharmaceutical composition in unit dosage form containing about 50 milligrams to 1 gram of a compound of the formula:



wherein R is a straight saturated hydrocarbon chain having from 13 to 20 carbon atoms or a straight unsaturated hydrocarbon chain having from 13 to 20 carbon atoms and from 1 to 4 double bonds and a significant amount of a pharmaceutical carrier.

3. A compound of the formula:



wherein R is a straight saturated hydrocarbon chain having from 13 to 20 carbon atoms or a straight unsaturated hydrocarbon chain having from 13 to 20 carbon atoms and from 1 to 4 double bonds.

4,187,320

PROCESS FOR PREPARING CHEWING GUM BASE USING SOLID ELASTOMER

Edwin R. Koch, Garden City; Leonard P. Abbazia, Brooklyn, and Wayne J. Puglia, Bellerose Village, all of N.Y., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed May 1, 1978, Ser. No. 901,371
Int. Cl.[2] A23G *3/30*
U.S. Cl. 426—3 40 Claims

1. A two-stage process for preparing a chewing gum base using solid elastomer which comprises:

A. a first stage wherein solid elastomer, an elastomer solvent and an oleaginous plasticizer are subjected to high intensity mixing under high shear conditions until a molten, uniform mass is obtained; said solid elastomer being initially subjected to high intensity mixing to masticate said solid elastomer until a uniform, lump-free mass is obtained, followed by the step-wise addition of said elastomer solvent with continuous high intensity mixing, followed by the step-wise addition of said oleaginous plasticizer with continuous high intensity mixing; and

B. a second stage wherein a hydrophobic plasticizer, an oleaginous plasticizer, a non-toxic vinyl polymer and an emulsifier are added to the molten, uniform mass of A, said second stage ingredients being added step-wise to the molten, uniform mass of A, with continuous high intensity mixing under high shear conditions; said high intensity mixing being continued until a uniform blend of ingredients is obtained.

4,187,321

METHOD FOR PRODUCING FOODS AND DRINKS CONTAINING BIFIDOBACTERIA

Masahiko Mutai, Higashi Yamato; Mitsuo Mada, Kodaira, and Kiyohiro Shimada, Kunitachi, all of Japan, assignors to Kabushiki Kaisha Yakult Honsha, Tokyo, Japan

Filed Dec. 15, 1977, Ser. No. 861,002
Claims priority, application Japan, Mar. 31, 1977, 52-37008
Int. Cl.[2] A23C *9/12*
U.S. Cl. 426—43 2 Claims

1. A method for producing foods and drinks containing at least two kinds of viable bifidobacteria, which comprises adding to a milk medium a bifidobacteria mixture containing at least one oxygen-resistant mutant strain of Bifidobacterium selected form the group consisting of *Bifodobacterium bifidum* YIt-4002, Deposit No. FERM-P 3371, *Bifidobacterium bifidum* YIT-4005, Deposit No. FERM-P 3372 and *Bifidobacterium breve* YIT-4006, Deposit No. FERM-P 3906, and at least one strain of obligatory anaerobic Bifidobacterium selected from the group consisting of *Bifidobacterium longum, Bifidobacterium breve, Bifidobacterium adolescentis, Bifidobacterium infantis* and *Bifidobacterium bifidum,* and growing the bifidobacteria mixture in the milk medium under aerobic conditions in the absence of added growth promoting substances normally necessary for the obligatory anaerobic Bifidobacterium alone to grow under aerobic conditions in a pure milk medium.

4,187,322

POWDER COMPOSITIONS CONTAINING VITAMIN C ACTIVE COMPONENT

Rene Josse, Rixheim, France, and Heinrich Klaui, Riehen, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Nov. 8, 1976, Ser. No. 739,879
Claims priority, application Switzerland, Nov. 30, 1975, 15466/75
Int. Cl.[2] A23K *1/00*
U.S. Cl. 426—72 17 Claims

14. A stable, vitamin C fortified animal feedstuff which comprises an admixture of (a) an animal feedstuff and (b) a dry, stable, free-flowing powder composition which comprises pre-swollen cereal grain having absorbed therein from about 15% to about 45% by weight, based on the total weight of the powder composition, of a vitamin C active component selected from the group consisting of ascorbic acid, an alkali metal salt thereof and an alkaline earth metal salt thereof and wherein said vitamin C active component is obtained from an aqueous solution of said acid or said salts.

4,187,323

COLORED WHEY

Rolf G. Gidlow, 4473 Olson Lake Trail, Lake Elmo, Minn. 55042

Filed Aug. 16, 1976, Ser. No. 714,311
Int. Cl.[2] A23C *21/00*
U.S. Cl. 426—250 12 Claims

1. A product comprising homogeneously mixed whey particles and first particulate material,

said first particulate material consisting principally of flour particles,

said whey particles incorporating a color additive and having the color of said additive,

said first particulate material having a color different from said color additive,

said product appearing to have the color of said color additive, and getting said appearance of said color additive from said colored whey particles in their solid state.

4,187,324
SOYBEAN BEVERAGE

Darrell B. Shirbroun, Box 225, Callender, Iowa 50523

Filed May 12, 1977, Ser. No. 796,148
Int. Cl.[2] A23F 1/14
U.S. Cl. 426—460 5 Claims

1. A process of preparing a coffee substitute soybean beverage, consisting essentially of, presoaking green soybeans in water to soften said beans, crushing said soaked beans to expel the oil therefrom and to

disrupt at least some of the bean cell walls, separating soybean oil from the crushed green bean, to provide

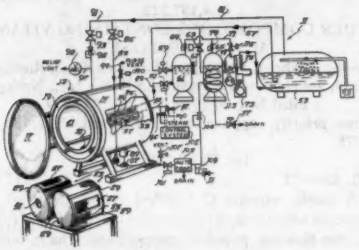
a soybean oil content of crushed green bean of about 0.5% or less by weight, pre-drying said crushed bean until it feels substantially dry, grinding the cell wall crushed green beans to conventional roast and ground coffee particle size, and

slow roasting said ground bean at a temperature of from about 350° F. to about 425° F. until the roasted ground beans have a conventional roast color appearance of roasted and ground coffee.

4,187,325
STEAM COOKING WITH DIRECT CONTACT CO_2 COOLING

Lewis Tyree, Jr., 145 Briarwood Ave., N., Oak Brook, Ill. 60521

Division of Ser. No. 831,227, Sep. 7, 1977, Pat. No. 4,137,723.
This application Feb. 2, 1979, Ser. No. 8,862
Int. Cl.[2] A47J 27/092
U.S. Cl. 426—510 11 Claims



1. A method of preparing food which comprises supplying liquid CO_2 from a high pressure storage vessel system to a holding tank and creating a coolant reservoir therein containing solid CO_2 at a pressure not greater than 60 psig,

compressing the CO_2 vapor created by said solid CO_2 formation and returning said vapor to said storage vessel,

disposing food to be cooked in a chamber,

pressuring said chamber to superatmospheric pressure with carbon dioxide vapor,

cooking said food by injection of steam into said chamber while said superatmospheric pressure is maintained,

freezing said cooked food by injecting liquid CO_2 into said chamber whereby CO_2 vapor is generated, and

recovering said CO_2 vapor generated in said chamber by condensing said vapor by melting said solid CO_2 in said reservoir.

7. Apparatus for preparing food, which apparatus comprises

a liquid carbon dioxide storage vessel system,

a holding tank,

means for supplying liquid CO_2 from said storage vessel system to said holding tank and for lowering the pressure therein below 60 psig to create a coolant reservoir including solid CO_2,

means for compressing CO_2 vapor from said holding tank and returning said compressed vapor to said storage vessel system,

a cooker including a chamber for receiving food,

means for pressuring said chamber to superatmospheric pressure with CO_2 vapor from said storage vessel system,

means for injecting steam into said chamber to cook said food while under said superatmospheric pressure,

means for injecting liquid CO_2 into said chamber to freeze said cooked food,

outlet means disposed in a bottom portion of said chamber,

conduit means connecting said outlet means with said holding tank,

said conduit means including a device for draining liquids therefrom while permitting the flow of vapor therethrough, and

pressure regulator means in said conduit means for maintaining a pressure of at least about 65 psig therein

whereby water resulting from condensation of steam drains from said conduit means via said device and whereby the CO_2 vapor generated in said chamber flows to said holding tank where it is condensed by melting said solid CO_2 in said reservoir.

4,187,326
DRY BEVERAGE MIX CONTAINING A CLOUDING AGENT

James M. Serafino, Stamford, Conn.; Slawko Yadlowsky, Manville, and John S. Witzeman, Rivervale, both of N.J., assignors to General Foods Corporation, White Plains, N.Y.

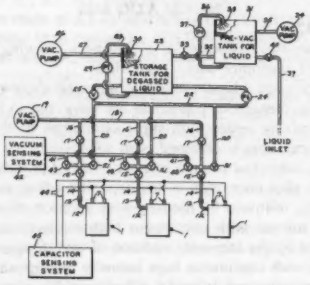
Filed Oct. 25, 1977, Ser. No. 844,686
Int. Cl.[2] A23L 2/00
U.S. Cl. 426—590 9 Claims

1. A fruit flavored dry beverage mix which comprises sugar, food acid, flavor and color wherein the improvement comprises a dry clouding agent which is obtained by co-drying an aqueous dispersion comprised of, on a dry basis, a major amount of solubilized malto dextrin and a minor amount of xanthan gum and titanium dioxide whereby the total dry beverage mix is storage stable and the reconstituted beverage obtained from the total dry mix has properties resembling the opacity and mouth-feel of a natural fruit juice and retains said opacity and mouth-feel for at least 24 hours when held at 50° F.

4,187,327
METHOD OF PROCESSING AN ELECTRICAL APPARATUS

John Lapp, Franklin, Wis., and John R. Willy, Greenwood, S.C., assignors to McGraw-Edison Company, Elgin, Ill.

Continuation of Ser. No. 612,028, Sep. 10, 1975, abandoned. This application May 31, 1977, Ser. No. 801,637
Int. Cl.[2] H01G 13/04; B05D 5/12
U.S. Cl. 427—8 3 Claims



1. A method of processing an electrical capacitor having an outer casing containing a polymeric dielectric material and electrically conductive layers, comprising the steps of degassing a dielectric liquid to remove gas therefrom by subjecting the liquid to a sub-atmospheric pressure, subjecting the interior of the casing to sub-atmospheric pressure to evacuate the same,

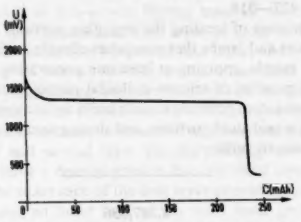
introducing the degassed dielectric liquid into the casing while maintaining a sub-atmospheric pressure on the interior of the casing and on said liquid, applying a super-atmospheric pressure to the degassed liquid disposed within the casing to impregnate the dielectric material, maintaining the dielectric material at a temperature below 60° C. during the steps of evacuating the casing and impregnating the dielectric material, and thereafter sealing the casing while maintaining the super-atmospheric pressure on the liquid.

4,187,328

METHOD OF PREPARING POSITIVE ACTIVE MATERIAL FOR ELECTRIC PRIMARY CELLS

Yves Jumel, Poitiers, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France

Division of Ser. No. 865,517, Dec. 29, 1977, Pat. No. 4,125,689. This application Jun. 16, 1978, Ser. No. 915,986
Claims priority, application France, Dec. 30, 1976, 76 39572
Int. Cl.² H01M *4/54, 6/04*
U.S. Cl. 427—8 **3 Claims**



1. A method of preparing a positive active material for primary electric cells, the method comprising:

adding a predetermined quantity of a reducing agent to a selected amount of silver peroxide powder sufficient to reduce an outer layer of each grain of said powder until a layer of metallic silver is formed on the surface of each of the powder grains;

reducing said powder with said reducing agent;

measuring the resistance of said powder; and terminating said reducing step as soon as the resistivity of said powder significantly decreases, thereby indicating the formation of a thin surface layer of metallic silver on the grains of said powder.

4,187,329

ELECTROPHOTOGRAPHIC DEVELOPING PROCESS AND COMPOSITIONS FOR USE THEREIN

Walter Crooks, Los Gatos, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 809,966, Mar. 24, 1969, abandoned. This application Feb. 3, 1971, Ser. No. 112,393
Int. Cl.² G03G *13/08, 9/08*
U.S. Cl. 430—110 **15 Claims**

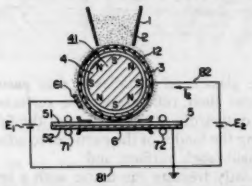
1. In an electrophotographic process wherein an electrostatic image is made visible by contacting the surface bearing said image with a developer comprising finely divided toner particles of thermoplastic resin binder containing coloring pigment, the improvement according to which toner filming of the image bearing surface is reduced by incorporating in the developer in an amount up to 10% by weight of the toner and in particle size smaller than the toner, a particulate pigment-free organic polymer additive selected from the group consisting of polytetrafluoroethylene, polyvinylfluoride, polyvinylidenefluoride, polyethylene, polyhexafluoropropylene, copolymers of tetrafluoroethylene with tetrafluoropropylene, and copolymers of tetrafluoroethylene with hexafluoropropylene.

4,187,330

ELECTROSTATIC DEVELOPING METHOD AND APPARATUS USING CONDUCTIVE MAGNETIC TONER

Hideki Harada, Urawa, and Keitarou Yamashita, Kamisatomachi, both of Japan, assignors to Hitachi Metals, Ltd., Japan

Filed Jan. 25, 1977, Ser. No. 762,268
Claims priority, application Japan, Jan. 30, 1976, 51-8430; Feb. 4, 1976, 51-10405
Int. Cl.² G03G *15/09*
U.S. Cl. 430—103 **14 Claims**



1. An electrostatic developing method comprising the steps of:

(a) attracting magnetic and inductively chargeable electroconductive toner particles which have a volume resistance ranging between 10^2 and $10^5\Omega$-cm in a D.C. electric-field of 100 V/cm, on an insulating carrier by a magnetic force of a permanent magnet means,

(b) carrying the toner particles in brush form on said insulating carrier close to an electrostatic latent image on an electrostatic latent image bearing medium,

(c) oppositely charging inductively the tips of the toner particles adjacent to the electrostatic latent image to that of the latent image, an electrode being provided to electrically contact the toner particles and being electrically connected with the image bearing medium, and

(d) attracting a part of the toner particles adjacent to the electrostatic latent image by means of an electric attraction force between the toner particles and the latent image.

2. An electrostatic developing method according to claim 1, wherein the permanent magnet means and the insulating carrier are rotated relative to each other for carrying the toner particles.

4,187,331

FLUORINE PLASMA RESIST IMAGE HARDENING

William Hsioh-Lien Ma, Wappingers Falls, N.Y., assignor to International Business Machines Corp., Armonk, N.Y.

Filed Aug. 24, 1978, Ser. No. 936,425
Int. Cl.² B05D *3/06*
U.S. Cl. 430—328 **10 Claims**

1. A process for stabilizing an organic polymer resist image layer formed on a substrate comprising placing the image layer bearing substrate in an electrodeless glow discharge in a low pressure fluorine containing atmosphere so as to harden the exposed surface of said layer and then heating said layer.

4,187,332

PROCESS FOR PRODUCING LIGHT-REFLECTIVE FABRICS

Glynn E. Fouche, Jr., Spartanburg, S.C., assignor to M. Lowenstein & Sons, Inc., New York, N.Y.

Filed Oct. 19, 1978, Ser. No. 952,781
Int. Cl.² G02B *5/12*; D06C *29/00*; B29D *9/08*; B32B *17/12*
U.S. Cl. 427—47 **11 Claims**

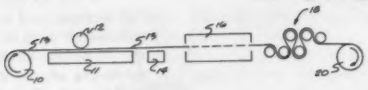
1. A method of producing light-reflective fabrics comprising the steps of:

(a) providing a textile fabric constructed of differentially dyed or dyeable yarns or fibers;

(b) applying to a surface of said fabric a liquid paste composi-

tion comprising an aqueous dispersion of reflex-reflective glass bead particles having a substantially hemispheric coating of a magnetizable component in an activatable binder, said paste composition including a carboxyvinyl polymeric thickner to provide a viscosity of the composition of between about 3,000 to 17,000 centipoise;

(c) applying a directional magnetic force field to the composition containing fabric to magnetically orient the reflex-



reflective glass bead particles in said paste composition and dispose their reflex-reflective surfaces of the bead particles outwardly of the surface of the fabric;

(d) activating the binder of the particles to adhesively secure them to said fabric surface; and

(e) subsequently treating the fabric with a textile finishing composition to increase the durability and resistance of the glass bead particles thereon to removal by washing.

4,187,333

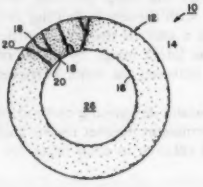
ION-EXCHANGE HOLLOW FIBERS

Alan Rembaum; Shiao-Ping S. Yen, both of Altadena, Calif., and Elias Klein, New Orleans, La., assignors to California Institute of Technology, Pasadena, Calif.

Division of Ser. No. 363,130, May 23, 1973, Pat. No. 3,944,485. This application Mar. 5, 1975, Ser. No. 555,526

Int. Cl.[2] C08J *5/20, 5/24*

U.S. Cl. 427—230 **8 Claims**



1. A method of forming an ion-exchange medium comprising the steps of:

introducing into one end of the central channel of a hollow, thin-wall, microporous fiber of a synthetic organic resin having pores which join to form a path across the wall of the fiber a mixture of liquid reactive monomers until the mixture appears at the second end thereof and exudes through the wall of the fiber to the outside surface thereof; and

reacting the monomers within the pores to form solid, insoluble ion-exchange resin particles having a diameter smaller than the pore diameter, and having an even distribution of fixed charge; said particles being embedded and constrained within said pores without blocking said pores or said path.

4,187,334

PROCESS AND MATERIAL FOR TREATING STEEL WALLS AND FANS IN ELECTRICAL PRECIPITATION INSTALLATIONS WITH MICRON COLLOIDAL GRAPHITE PARTICLES

Micheal D. LaBate, 115 Hazen Ave., Ellwood City, Pa. 16117

Filed Nov. 1, 1978, Ser. No. 956,497

Int. Cl.[2] B05D *7/22*

U.S. Cl. 427—236 **4 Claims**

1. A process of treating the inner steel walls and fluid handling and moving devices in electrical precipitation installations that consists essentially of the steps of cleaning said steel walls and devices, penetrating a liquid suspension of micron colloidal particles of graphite into said cleaned steel walls and devices so as to build up a smooth covering coating on said steel walls and devices, said micron colloidal suspension including more than about 15% by weight micron colloidal particles of graphite and less than about 75% by weight micron colloidal particles of graphite, between about 15% to 75% by weight water, between about 15% to 75% by weight alcohol and substantially about 1% to 2% by weight liquid soap, and drying said coating to form a slick, smooth surface.

4,187,335

PROCESS FOR TREATING COKE OVEN DOORS AND JAMBS TO PREVENT THE BUILD UP OF TAR THEREON

Micheal D. LaBate, 115 Hazen Ave., Ellwood City, Pa. 16117

Continuation of Ser. No. 905,513, May 15, 1978. This application Oct. 5, 1978, Ser. No. 948,886

Int. Cl.[2] B08B *17/02*

U.S. Cl. 427—318 **6 Claims**

1. A process of treating the engaging portions of steel coke oven doors and jambs that comprises cleaning said portions to the bare metals, applying at least one penetrating coating of a liquid suspension of micron colloidal particles of graphite to said cleaned steel portions so as to build up a smooth convering coating on said steel portions, and drying said coating to form a slick smooth surface.

4,187,336

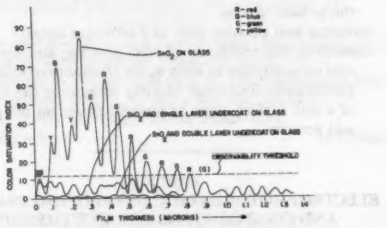
NON-IRIDESCENT GLASS STRUCTURES

Roy G. Gordon, 22 Highland St., Cambridge, Mass. 02138

Filed Apr. 4, 1977, Ser. No. 784,542

Int. Cl.[2] B32B *15/00, 9/00, 9/04*

U.S. Cl. 428—34 **104 Claims**



1. In a structure formed of at least one transparent glass sheet and comprising thereon a first inorganic coating of an infra-red reflective material which material is of the type that is a transparent semiconductor and normally exhibits iridescent colors in daylight illumination, the improvement wherein

a second coating, is between said glass and said first coating, and said second coating

forms means to substantially diminish iridescent colors of said first coating by providing at least two interfaces which form means, together with the mass of said second coating, to reflect and refract light such that the observability, in daylight illumination, of said iridescent colors is substantially reduced; and

wherein said second coating has a refractive index defined as about the square root of the multiple of the refractive indices of said glass and said first coating, and

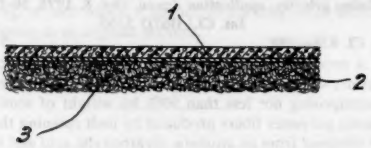
wherein said second coating has a thickness of about ¼ wavelength of light having a vacuum wavelength of about 500 nanometers.

4,187,337

ANTI-SLIP UNDERLAY

Roland H. Romageon, 165 boulevard Bineau, Neuilly sur Seine, France

Filed Dec. 28, 1977, Ser. No. 865,249
Claims priority, application France, Jan. 6, 1977, 77 0023
Int. Cl.[2] B32B *5/06*
U.S. Cl. 428—95 3 Claims



1. An underlay for carpets, rugs and the like, comprising:
a first layer which is of resilient material selected from the group comprising resilient synthetic foam material and rubber;
a second layer of non-woven fibrous material which is secured to one face of said first layer without substantial penetration of its fibers into said first layer; and
a third layer of non-woven fibrous material which is connected by inerlocking with the fibers of said second layer, said second layer of non-woven fibrous material being needle-felted to cause compaction and interlocking of the fibers of said second layer thereby causing said second layer to have a density greater than the third layer;
whereby the outer face of the first layer provides a non-skid surface and an outer face of the third layer provides a relatively rought, fibrous surface.

4,187,338

METHOD FOR PRODUCING A FOAMED BODY HAVING CHEMICALLY EMBOSSED PATTERNS

Nobuo Miura, Kashiwa, Japan, assignor to Lonseal Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 659,104, Feb. 18, 1976, Pat. No. 4,082,876. This application Jan. 5, 1978, Ser. No. 867,033
Claims priority, application Japan, Feb. 20, 1975, 50-21655
The portion of the term of this patent subsequent to Apr. 4, 1978, has been disclaimed.
Int. Cl.[2] B29D *27/00*
U.S. Cl. 28—159 25 Claims

1. A method for producing a foamed body having a chemically embossed pattern, which comprises:
forming a composition containing a plasticized vinyl chloride resin, a synthetic rubber material capable of being vulcanized, a blowing agent, a vulcanizing agent and a vulcanization promotor into a sheet;
printing an ink containing a vulcanizing accelerator onto said sheet in a desired configuration;
drying and curing the printed sheet by heating said printed sheet to a temperature of up to 100° C.; and
heating said dried sheet to a temperature of 150°–250° C. to cause foaming of said sheet thereby generating a sheet having said chemically embossed patterns therein.

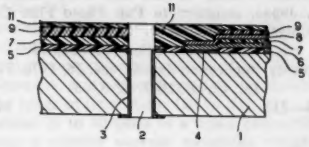
24. An embossed foamed body prepared by the method of claim 1.

4,187,339

PRINTED CIRCUITS

Pierre-Henri Cayrol, 20, Avenue Beauséjour, 77500 Chelles, France

Filed Aug. 30, 1978, Ser. No. 938,104
Claims priority, application France, Aug. 31, 1977, 77 27152
Int. Cl.[2] H05K *1/00*; B32B *5/16*
U.S. Cl. 428—208 4 Claims



1. A method of making a printed circuit which comprises the steps of:
(a) applying to an electrically insulating substrate formed with metallized holes and conductive zones upon a surface of the substrate a first insulation layer through which portions of said zones are exposed;
(b) applying over said first insulating layer beads of electrically conductive hardenable synthetic-resin material bridging at least some of said zones to electrically interconnect the same;
(c) hardening said beads of synthetic-resin material;
(d) applying over the hardened beads while leaving at least some of said holes exposed, a second layer of electrically insulating material; and
(e) mounting circuit board components above said second layer with leads extending into and soldered to said holes.

3. A printed circuit assembly comprising:
(a) an electrically insulating board formed with metallized holes and electrically conductive zones upon a surface of said board;
(b) a first layer of insulating material overlying the surface of said board provided with said zones and leaving at least some of said zones exposed;
(c) a plurality of beads of hardened conductive synthetic resin overlying said first layer and electrically interconnecting at least some of the zones left exposed by said first layer;
(d) a second electrically insulating layer overlying said beads and said first layer; and
(e) circuit components mounted above said second layer and having leads extending into and soldered to said holes.

4,187,340

METHOD OF FORMING PATTERNED TRANSPARENT ELECTRO-CONDUCTIVE FILM ON THE SUBSTRATE OF LIQUID CRYSTAL DISPLAY

Rokuji Oishi; Yasuharu Okajima; Satoshi Noguchi, all of Yokohama, and Kazuyuki Akeyoshi, Yamato, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 359,641, May 14, 1973, abandoned. This application Apr. 17, 1975, Ser. No. 569,000
Int. Cl.[2] B32B *3/10, 17/06*
U.S. Cl. 428—210 3 Claims

1. A glass substrate having a patterned transparent electroconductive film formed thereon, which coated substrate is used as the electrode plates for liquid crystal display cells, and is prepared by the process, which comprises the steps of:
printing a paste containing a vehicle which easily decomposes at a temperature of 350°–550° C. on a predetermined portion of said glass substrate and drying said paste;
coating said substrate with a low valence metal oxide mixture comprising 85–70 wt. % of In_2O_3 and 15–30 wt. % of SnO_2 by deposition on said printed substrate in a vacuum to form a transparent electroconductive metal oxide coating; and

simultaneously decomposing said vehicle of said paste and oxidizing said low valence metal oxide by heating in the range of 300°–600° C. said coated substrate in an atmosphere containing oxygen.

4,187,341

MAGNETIC RECORDING TAPE

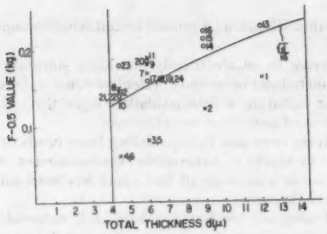
Masaaki Suzuki; Osamu Suzuki, and Goro Akashi, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Nov. 17, 1977, Ser. No. 852,574

Claims priority, application Japan, Nov. 26, 1976, 51-141323

Int. Cl.² B32B *7/02, 5/16*

U.S. Cl. 428—213 **10 Claims**



1. A magnetic recording tape comprising a base layer and a magnetic layer, said tape having a total thickness of 4.0 to 14.5μ, a base to magnetic layer thickness ratio of 2:3 to 3:2, a base to magnetic layer Young's modulus ratio of 1:2 to 2:1 and a tensile strength at 0.5% elongation of at least $\sqrt{d}/16$ (Kg), where d is the total thickness (in microns) of the tape.

4,187,342

BONDED FIBER WEB, WHICH IS CAPABLE OF ABSORBING WATER VAPOR COMPRISING A SWELLABLE CELLULOSE ETHER IN FIBER FORM

Arno Holst; Helmut Lask, both of Wiesbaden; Ehrenfried Nischwitz, Schmitten-Oberreifenbg., and Wilhelm Fischer, Pirmasens, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 10, 1978, Ser. No. 885,326

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1977, 2710874

Int. Cl.² D04H *1/42, 1/64;* **D06M** *15/52;* **D06N** *3/00*

U.S. Cl. 428—283 **8 Claims**

1. In a bonded fiber web capable of absorbing water vapor and composed of synthetic, natural or regenerated fibers with an uniformly incorporated additive of at least one polymer,

the improvement comprising about 3 to 70% by weight, relative to the total fiber proportion, of said additive which comprises fibrous particles of at least one swellable cellulose ether, which has been modified by crosslinking, effected by means of heat energy, radiation, or an additional chemical compound and which is insoluble in water to the extent of at least about 30% by weight.

5. In the process for the manufacture of a bonded fiber web capable of absorbing water vapor and composed of synthetic, natural or regenerated fibers with an uniformly incorporated additive of at least one polymer,

the improvement comprising (a) adding to the synthetic, natural or regenerated fibers, before or during the manufacture of the web, about 3 to 70% by weight, relative to the total fiber proportion, of fibrous particles of at least one swellable cellulose ether, which has been modified by crosslinking, effected by means of heat energy, radiation, or an additional chemical compound and which is insoluble in water to the extent of at least about 30% by weight, (b) incorporating said fibrous particles uniformly therein, (c) bonding the fiber web, and (d) drying it after bonding.

4,187,343

PROCESS FOR PRODUCING NON-WOVEN FABRIC

Takashi Akiyama; Akinori Tanji, and Seiichi Asano, all of Otsu, Japan, assignors to Toyobo Co., Ltd., Osaka, Japan

Filed Oct. 8, 1976, Ser. No. 730,983

Claims priority, application Japan, Oct. 8, 1975, 50-122259

Int. Cl.² B67D *5/60*

U.S. Cl. 428—288 **5 Claims**

1. A process for producing a non-woven fabric, which comprises drawing uniaxially or biaxially a non-woven sheet material comprising not less than 90% by weight of semi-drawn aromatic polyester fibers produced by melt spinning the polyester obtained from an aromatic dicarboxylic acid and an alkaline glycol wherein not less than 80% by mol of the component unit of the polyester is an ethylene terephthalate chain, said fibers having a breaking elongation of 80 to 150% wherein the fibers are crossed and intertwined with each other and are partially bonded at the crossing points, said drawing being carried out until the bonding of the fibers is partially broken or the fibers are partially cut.

4,187,344

PROTECTIVE SILICON NITRIDE OR SILICON OXYNITRIDE COATING FOR POROUS REFRACTORIES

John I. Fredriksson, Holden, Mass., assignor to Norton Company, Worcester, Mass.

Filed Sep. 27, 1978, Ser. No. 946,337

Int. Cl.² B32B *9/04*

U.S. Cl. 428—304 **6 Claims**

1. A porous refractory article including a protective coating thereon, said coating being a material selected from the group consisting of silicon nitride, silicon oxynitride, and mixtures thereof, and wherein said coating has penetrated the porous refractory article to a depth greater than the depth of the surface pores therein.

4,187,345

MAGNETIC RECORDING MEDIUM

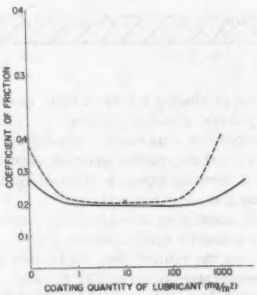
Nobutaka Yamaguchi; Masaaki Fujiyama, and Satoru Takayama, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 836,709, Sep. 26, 1977, abandoned. This application Aug. 21, 1978, Ser. No. 935,123

Claims priority, application Japan, Sep. 26, 1976, 51-116025

Int. Cl.² H01F *10/00*

U.S. Cl. 428—337 **9 Claims**



1. A magnetic recording medium which comprises a support having a surface roughness of at most 0.35 micron, a magnetic recording layer on one side of the support and a lubricant layer

on the other side of the support, the lubricant layer being a lubricant represented by the following general formula:

$$R-O-(CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-O)_x-(CH_2-CH_2-O)_yH$$

in which $R=C_nH_{2n+1}$, $n=12-18$, $x=0-8$ and $y=1-50$, which is coated on the support in a mean coating quantity of 1 to 200 mg/m^2 and which is applied to the support in the form of a solution in an organic solvent.

4,187,346

CONTROLLED PERMEATION PROCESS FOR FIREPROOFING WOOD

George W. Jarrett, Jackson, Miss., assignor to Shelby-Williams Industries, Inc., Morristown, Tenn.

Filed Aug. 22, 1978, Ser. No. 935,861
Int. Cl.^{2} B05D *3/00, 3/02, 1/18;* B32B *21/04*
U.S. Cl. 428—342 **33 Claims**

1. A process for fireproofing and strengthening wood by employing controlled permeation of a fire retardant compound in the cellular structure of a wood comprising:

(a) evacuating and expanding the cellular structure of a wood by utilizing a sufficient amount of dry heat, vacuum or a combination thereof to activate the cellular structure of said wood for receiving a fire retardant solution to a depth of about 1% to 40% of the thickness of the treated wood;

(b) immersing said evacuated and expanded cellular structure of said wood in a fire retardant solution composed of a combination of a halide salt of a Group I or Group II metal and an ammonium salt to provide a reaction between said halide salt and said ammonium salt and deposit a reaction product in said cellular structure of said wood;

(c) dissipating said dry heat, vacuum or combination thereof after said evacuated and expanded cellular structure of said wood is immersed in said fire retardant solution to draw said fire retardant solution into said wood and deposit said reaction product; and

(d) drying said wood by exposing said wood to the atmosphere or drying in a kiln for about 15 minutes to 72 hours at a temperature of from about 100° F. to 175° F. or a combination of said atmospheric and kiln drying.

18. The product produced by the process of claim 1.

4,187,347

ENCAPSULATED IMPREGNATED ROVINGS

Richard L. Brook, Mount Prospect, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.

Division of Ser. No. 557,656, Mar. 12, 1975. This application Apr. 5, 1976, Ser. No. 673,724
Int. Cl.^{2} D02G *3/00*
U.S. Cl. 428—375 **6 Claims**

1. A solid impregnated roving comprising a fibrous roving impregnated with a thermosetting epoxy resin composition in uncured semi-solid form, said impregnated roving being encapsulated within a thin membrane coating of a solid phenolformaldehyde novolac.

4,187,348

THERMOSET IMIDAZOLE CURED EPOXY-POLYSULFIDE RUBBER AUTOMOTIVE BODY SOLDER

Thomas J. Dearlove, Troy; Richard K. Gray, Warren, and Richard P. Atkins, Royal Oak, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1978, Ser. No. 917,670
Int. Cl.^{2} C08L *63/02*
U.S. Cl. 428—418 **5 Claims**

1. A spreadable thermosetting automotive body solder composition comprised in parts by weight of

100 parts of an epoxy resin adduct of epichlorohydrin and bisphenol A, said adduct having epoxy equivalent weight in the range of from about 180 to 200;

from about 25 to 40 parts of a liquid polysulfide polymer having a number average molecular weight of about 1,000;

from about 0.02 to 0.06 moles imidazole curing agent, said imidazole being substituted in the 2-position with a hydrocarbon group;

and a filler system consisting essentially of

from about 5 to 20 parts aluminum powder;

from about 10 to 20 parts ion-exchanged clay;

from about 3 to 6 parts of a wetting agent for said clay; and

from about 70 to 130 parts talc having particles substantially in the shape of short fibers or platelets with an average particle size of about 3 microns or less,

wherein said filler system provides said body solder with thixotropic properties in the uncured state and sag resistance in the cured and uncured states at temperatures of up to about 200° C.

4,187,349

BONDING OF RUBBER TO REINFORCING ELEMENTS

Heimo J. Langer, Columbus, Ohio, and William J. McKillip, Crystal Lake, Ill., assignors to Ashland Oil, Inc., Ashland, Ky.

Filed Mar. 26, 1975, Ser. No. 562,072
Int. Cl.^{2} B32B *27/34;* D02G *3/00*
U.S. Cl. 428—395 **4 Claims**

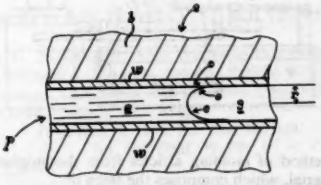
1. A rubber-reinforcing element in the form of a filamentary substrate of polyester having a heat-cured first coating comprising the reaction product of a polyepoxide and an addition polymerization product consisting essentially of a copolymer of N-vinylpyrrolidone and an aminimide selected from the group consisting of dimethyl-(2-hydroxypropyl)amine methacrylimide and trimethyl amine methacrylimide, and a heat-cured second coating of a RFL adhesive.

4,187,350

POROUS CATALYZED ELECTRODE PROVISION AND TECHNIQUE

James A. McIntyre, and Robert F. Phillips, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 5, 1978, Ser. No 939,594
Int. Cl.^{2} H01M *4/90;* C25B *11/03*
U.S. Cl. 429—45 **22 Claims**



12. A catalyzed porous electrode body having a structure comprising:

an electroconductive material of construction shaped into electrode body form;

said electrode body form containing a great multiplicity of fine pores traversing said body that have an average nominal diameter size or equivalent measure of between about 0.1 and 12 microns;

said electrode body form also having a porosity of between about 30 and about 90 volume percent, based on the volume of porulous void space in the total volume of the electrode body;

said body being further characterizable as the physically compressed and densified remains of a porous pre-form of a preliminary body of the same material of construction copiously laced with interstitial passageways that were precursors of said fine pores and which had an average nominal diameter or equivalent measure in excess of about 12 microns.

4,187,351

IMVIC TEST METHOD

Edmund M. Powers, Saxonville, Mass., assignor to The United States of America as represented by the secretary of the Army, Washington, D.C.

Filed Nov. 25, 1977, Ser. No. 855,101

Int. Cl.² C12Q *1/10*

U.S. Cl. 435—38 **10 Claims**

1. An improved IMViC test method suitable for confirming the presence of *Escherichia coli,* for differentiating between bacteria of the genera Escherichia and Enterobacter and for distinguishing members of the family Enterobacteriaceae which comprises:

obtaining a suitable culture of said bacteria;

inoculating a test plate with an isolated colony of said bacteria from said suitable culture, said test plate containing test media for (a) indole, (b) methyl red, (c) Voges-Proskauer and (d) citrate tests in separate compartments wherein each of said test media is a solid agar medium and wherein the test medium for the methyl red and Voges-Proskauer tests is an unbuffered glucose peptone medium in which sodium chloride is substituted for dipotassium phosphate;

incubating said inoculated test plate to enable said bacteria to grow on said test plate; and,

determining the results of said tests.

4,187,352

METHOD AND APPARATUS FOR PRODUCING SYNTHETIC PLASTICS PRODUCTS, AND PRODUCT PRODUCED THEREBY

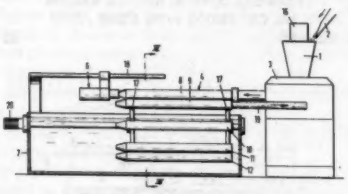
Eduard J. G. Klobbie, Sneek, Netherlands, assignor to Lankhorst Touwfabrieken B.V., Sneek, Netherlands

Filed Mar. 7, 1978, Ser. No. 884,271

Claims priority, application Netherlands, Apr. 19, 1977, 7704265

Int. Cl.² B29D *27/00*

U.S. Cl. 521—79 **6 Claims**



1. A method of molding articles from thermoplastic synthetic material, which comprises the steps of

(a) simultaneously introducing into an extruder apparatus having no screen member and no extrusion nozzle a quantity of a blowing agent and a mass of material at least 75% of which comprises a thermoplastic synthetic resin material;

(b) heating and mixing the components in the extruder apparatus to cause the synthetic resin material to be in a fluid condition at atmospheric pressure;

(c) introducing the mixture at atmospheric pressure into one end of an open ended mold; and

(d) cooling and removing the mixture from the mold.

5. An article produced by the method of claim 1.

4,187,353

FOAMABLE POLYMER MATERIAL

Güenter Schröeder, Ober-Ramstadt, Fed. Rep. of Germany, assignor to Rohm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Jun. 6, 1978, Ser. No. 912,962

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1977, 2726260

Int. Cl.² C08V *9/12, 9/14*

U.S. Cl. 521—149 **8 Claims**

1. A foamable polymer composition comprising

(A) a copolymer of 20–99.99 percent by weight of a member selected from the group consisting of acrylic acid and methacrylic acid, 0–79.99 percent by weight of a further ethylenically unsaturated monomer copolymerizable therewith, and 0.01–5 percent by weight of a member selected from the group consisting of metal salts of acrylic acid and methacrylic acid, and

(B) a foaming agent compatible with said copolymer.

4,187,354

PROCESS FOR LOWERING THE VISCOSITY OF FORMOSE OR MIXTURES OF FORMOSE IN MONO- AND/OR DI-SACCHARIDES, PRODUCTS PRODUCED THEREBY, AND THE USE THEREOF IN PRODUCING POLYURETHANE RESINS

Kuno Wagner, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 829,173, Aug. 30, 1977. This application Aug. 17, 1978, Ser. No. 934,577

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1977, 2738513

Int. Cl.² C08G *18/14*

U.S. Cl. 521—158 **11 Claims**

1. A process for lowering the viscosity of formose or mixtures of formose and mono- and/or di-saccharides by the addition of a viscosity reducing agent wherein dialkylphosphites comprise the viscosity reducing agents.

4,187,355

PRODUCTION OF POLYALKYLENE GLYCOL ETHERS FROM FORMOSE AND USE THEREOF IN THE PREPARATION OF POLYURETHANE RESINS

Kuno Wagner, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 829,173, Aug. 30, 1977. This application Aug. 17, 1978, Ser. No. 934,578

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1977, 2737951

Int. Cl.² C08G *18/14*

U.S. Cl. 521—158 **11 Claims**

1. A process for the production of polyether polyols having an average molecular weight of from 200 to 10,000 and an average hydroxyl functionality of from 2.0 to 7.0, comprising reacting one or more cyclic ethers, optionally successively, with a starter comprising:

(A) formose which is optionally α-aldolized; or

(B) liquid mixtures of:

(a) high molecular weight and/or low molecular weight polyhydroxyl compounds and/or mono- or di-saccharides and/or natural or synthetic invert sugars; and

(b) formose which is optionally α-aldolized

in the presence of an acid catalyst.

4,187,356

CONDENSATION OF FORMALDEHYDE HYDRATE TO FORM MIXTURES WHICH, TOGETHER WITH MONOMERS CAPABLE OF AMINOPLAST FORMATION ARE USEFUL IN THE PREPARATION OF POLYURETHANE FOAMS

Kuno Wagner, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 829,173, Aug. 30, 1977. This application Aug. 17, 1978, Ser. No. 934,649

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1977, 2738532

Int. Cl.[2] C08G *18/14*

U.S. Cl. 521—158 24 Claims

1. Isocyanate reactive mixtures comprising

(a) 10–95% by weight (based on a+b+c) of a mixture of polyhydric alcohols, hydroxyaldehydes and hydroxyketones obtained by the condensation of formaldehyde hydrate,

(b) 5–80% by weight (based on a+b+c) of monomers capable of aminoplast formation or their N-methylolation products and

(c) 0–80% by weight (based on a+b+c) of water.

4,187,357

PROCESS FOR THE PREPARATION OF POLYURETHANE FOAMS

Arthur L. Austin, Southgate; William W. Levis, Jr., Wyandotte; Louis C. Pizzini, Trenton, and Robert J. Hartman, Southgate, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Division of Ser. No. 590,332, Jun. 25, 1975, Pat. No. 4,097,399, which is a division of Ser. No. 425,524, Dec. 17, 1978, Pat. No. 3,957,922. This application Apr. 13, 1978, Ser. No. 895,989

The portion of the term of this patent subsequent to Oct. 4, 1994, has been disclaimed.

Int. Cl.[2] C08G *18/14*

U.S. Cl. 521—159 6 Claims

1. A polyurethane foam composition comprising, based on the total weight of ingredients, a foamed mixture containing

(A) 20 to about 100 parts of an oxyalkylation polyol prepared by

(1) providing a mixture containing

(a) a phenol, at least in an amount sufficient to form a complex with an aluminum or iron substance in the mixture;

(b) a non-phenolic active hydrogen compound having 2 to 8 active hydrogens per molecule and having an average molecular weight below about 10,000;

(c) a substance containing aluminum or iron which will form a complex with phenol, and

(d) an organic acid anhydride, at least one of which components (a), (b), and (d) is halogenated.

(2) heating the mixture to a temperature in the range of from about 80° C. to about 250° C.; and

(3) oxyalkylating the heated mixture by adding thereto sufficient alkylene oxide having from 2 to 12 carbon atoms to form an oxyalkylated polyol product.

(B) 40 to about 60 parts of a polyarylpolyalkylene polyisocyanate having a functionality of about 2.2 to 3.3 or of an isocyanate terminated prepolymer derived from the reaction of a stoichiometric excess of said polyarylpolyalkyleneisocyanate with said oxyalkylation polyol; and

(C) 0.2 to about 2 parts of a wetting agent, and

(D) 5 to about 30 parts of a blowing agent.

4,187,358

RESIN COMPOSITION

Kayomon Kyo, Kyoto; Yasuhiko Asai, Uji; Sadao Kato, Uji; Tadashi Ishikura, Uji, and Hiroshi Sugawara, Uji, all of Japan, assignors to Unitika Ltd., Amagasaki, Japan

Filed Dec. 28, 1978, Ser. No. 974,210

Claims priority, application Japan, Dec. 29, 1977, 52/160047

Int. Cl.[2] C08L *77/00*

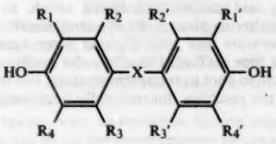
U.S. Cl. 525—132 20 Claims

1. A resin composition comprising

(A) about 5 to about 94.9% by weight of an aromatic copolyester comprising the reaction product in about equimolar amounts of

(1) a mixture of terephthalic acid and isophthalic acid and/or the functional derivatives thereof with the terephthalic acid unit to the isophthalic acid unit molar ratio being about 9:1 to about 1:9 and

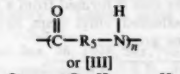
(2) a bisphenol of the general formula [I]



[I]

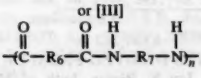
wherein —X— represents a member selected from the group consisting of —O—, —S—, $-SO_2-$, —SO—, —CO—, an alkylene group containing 1 to 5 carbon atoms and an alkylidene group containing 1 to 5 carbon atoms, and R_1, R_2, R_3, R_4, R_1', R_2', R_3' and R_4', which may be the same or different, each is selected from the group consisting of a hydrogen atom, a chlorine atom, a bromine atom and an alkyl group containing 1 to 5 carbon atoms, and/or a derivative thereof;

(B) about 5 to about 94.9% by weight of a polyamide containing therein a repeating unit of the following general formula [II]:



[II]

or [III]



[III]

wherein R_5, R_6 and R_7, which may be the same or different, each represents an alkylene group containing 4 to 11 carbon atoms and n is an integer from 30 to 500, and

(C) about 0.1 to about 90% by weight of an ionomer.

4,187,359

ACETYLENE-TERMINATED POLYIMIDE COMPOSITIONS

Lewellyn G. Picklesimer, 3765 Winthrop Dr., Dayton, Ohio 45431; Michael A. Lucarelli, 175 Old Dayton Yellow Springs Rd., Fairborn, Ohio 45324, and Theodore J. Reinhart, Jr., 345 Forrer Blvd., Dayton, Ohio 45419

Filed Dec. 6, 1978, Ser. No. 967,049

Int. Cl.[2] C08L *77/10*

U.S. Cl. 525—6 3 Claims

1. A composition of matter comprising a major amount of an acetylene-terminated polyimide oligomer and a minor amount of trinitriloacetonitrile.

4,187,360
HEAT-SHRINKABLE OR HEAT-EXPANDABLE PRODUCTS FROM HYDROGENATED POLYBUTADIENE

Thomas A. Peters, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 18, 1975, Ser. No. 597,262
Int. Cl.² B29H *5/01*
U.S. Cl. 525—339 **10 Claims**

1. A process for producing a dimensionally heatunstable article which comprises:

(a) hydrogenating to 0.01 to about 10 percent residual unsaturation a polybutadiene which, prior to hydrogenation, contains from about 15 to about 55 percent trans 1,4-addition and from about 15 to about 40 percent cis 1,4-addition, and thereafter recovering the resulting hydrogenated polybutadiene;

(b) shaping and vulcanizing said hydrogenated polybutadiene, and thereafter recovering the resulting shaped, vulcanized article; and

(c) subjecting said shaped, vulcanized article to a force sufficient to alter its dimensions at a temperature between room temperature and 150° C., said force being maintained for a time sufficient to allow the resulting shape-altered article to cool to room temperature, and thereafter recovering the resulting dimensionally heat-unstable article.

4,187,361
METHOD FOR PREPARING POLYPHENYLENE OXIDES WITH MANGANESE-VINYL RESIN COMPLEXES

Eugene G. Banucci, Scotia, and Walter K. Olander, Clifton Park, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 753,562, Dec. 21, 1976, Pat. No. 4,110,312.
This application Jun. 22, 1978, Ser. No. 917,795
Int. Cl.² C08F *8/42*
U.S. Cl. 525—4 **12 Claims**

1. A heterogeneous polymer-bound catalyst for the oxidative coupling of phenolic monomers, said catalyst comprising a manganese (II) complex that is formed from a manganese (II) compound and a crosslinked vinyl resin having units that contain a benzoin oxime group.

4,187,362
SYNTHETIC RESINS DERIVED FROM PETROLEUM

Paul Hepworth, and Ian S. Ripley, both of Middlesbrough, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Apr. 2, 1976, Ser. No. 673,055
Claims priority, application United Kingdom, Apr. 16, 1976, 15642/75
Int. Cl.² C08F *240/00*
U.S. Cl. 526—73 **9 Claims**

1. A process for the production of a synthetic resin which comprises preheating to a temperature of at least 160° C. for a period of not more than 5 hours a C_5 stream boiling in the range 10° to 80° C. and which is derived from a thermally or steam cracked naphtha or gas oil and which contains 1 to 50% by weight butadiene and then polymerising the stream by treatment with a Friedel-Crafts catalyst.

4,187,363
VINYL CHLORIDE POLYMERIZATION METHOD

Richard A. Marshall, Akron; Edwin S. Smith, Cuyahoga Falls, and Frank A. Cich, Norton, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed May 24, 1978, Ser. No. 909,221
Int. Cl.² C08F *114/06*
U.S. Cl. 526—208 **2 Claims**

1. A method of achieving chain transfer in a suspension polymerization of a vinyl chloride monomer to a polyvinyl chloride product comprising polymerizing said monomer in the presence of a peroxide catalyst and aldehydes of 3 to 6 carbon atoms as the chain transfer agent and treating product with an alkali bisulfite solution after the vinyl chloride monomer has been removed to obtain the polyvinyl chloride.

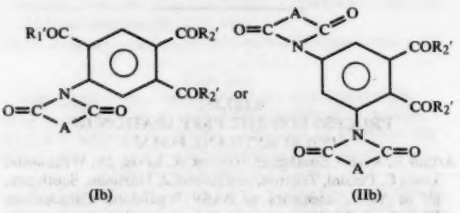
4,187,364
CROSSLINKABLE POLYMERS OF UNSATURATED IMIDES

Roland Darms; Josef Pfeifer, both of Therwil, and Vratislav Kvita, Muttenz, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 696,350, Jun. 15, 1976, Pat. No. 4,115,359.
This application Jul. 6, 1978, Ser. No. 922,268
Claims priority, application Switzerland, Jun. 18, 1975, 7955/75
Int. Cl.² C08G *73/12, 73/14, 73/16*
U.S. Cl. 526—259 **14 Claims**

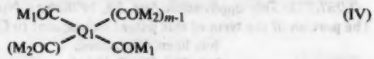
1. A crosslinkable polymer which has an average molecular weight of at least 1,200, or the corresponding cyclized imide derivative, which is manufactured by reacting at a temperature between about −50° and 300° C. in the melt or in an inert organic solvent or solvent mixture

0.5 to 100 mol% of a compound of the formula Ib or IIb



(Ib) (IIb)

and 0 to 99.5 mol% of a compound of the formula IV

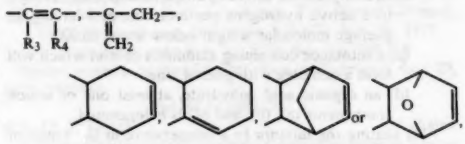


(IV)

with substantially stoichiometric amounts of a compound of the formula V

HY—Q—XH

in which formulae m and n independently of one another represent the number 1 or 2, A represents a radical of the formula



R_2' represents phenoxy; phenoxy substituted by one or two nitro groups, by one alkyl of 1 to 2 carbon atoms, by one alkoxy of 1 to 2 carbon atoms or by two to five halogen atoms; alkoxy with 1 to 18 carbon atoms or the two R_2's conjointly represent the —O— grouping,

R'_1 represents a chlorine atom, phenoxy; phenoxy substituted by one or two nitro groups, by one alkyl of 1 to 2 carbon atoms, by one alkoxy of 1 to 2 carbon atoms or by two to five halogen atoms; or alkoxy of 1 to 18 carbon atoms,

R_3 and R_4 independently of one another represent hydrogen, chlorine or bromine,

X and Y represent —O— or one of X and Y represents —O— and the other denotes

where R_5 represents hydrogen, alkyl with 1–4 carbon atoms or phenyl,

Q represents an aliphatic radical with at least 2 carbon atoms or a cycloaliphatic, araliphatic, carbocyclic-aromatic or heterocyclic-aromatic radical, and

Q_1 represents an aliphatic radical or a cycloaliphatic, carbocyclic-aromatic or heterocyclic-aromatic radical, in which the carbonyl and carboxyl groups are bonded to different carbon atoms and the carboxyl groups are each in the ortho-position relative to a carbonyl group,

M_1 represents a chlorine atom, a hydroxyl group, phenoxy; phenoxy substituted by one or two nitro groups, by one alkyl of 1 to 2 carbon atoms, by one alkoxy of 1 to 2 carbon atoms or by two to five halogen atoms; or alkoxy with 1 to 18 carbon atoms, or when m or n is 2, M_1, conjointly with M_2, forms the —O— grouping and

the groups $—COM_1$ and $—COM_2$ are bonded to different carbon atoms and the $—COM_1$ groups are each in the ortho-position relative to a $—COM_2$ group.

4,187,365

PROCESS FOR THE PRODUCTION OF POLYCONDENSATE CONTAINING CYCLIC IMIDE GROUPS

Wilfried Zecher; Werner Clarenz; Willi Dunwald, and Rudolf Merten, all of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 788,112, Apr. 18, 1977, abandoned, which is a continuation of Ser. No. 610,989, Sep. 8, 1975, abandoned. This application May 15, 1978, Ser. No. 906,259

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1974, 2443576; Sep. 12, 1974, 2443575

Int. Cl.[2] C08G *18/00, 73/10*

U.S. Cl. 528—45 **2 Claims**

1. A process for the production of polycondensates linked by cyclic imide groups and especially capable of lacquering metals, wherein at least one organic polyisocyanate or masked isocyanate, formic acid and at least one cyclic dicarboxylic acid anhydride compound which, in addition to the cyclic anhydride group, is substituted at least once by another cyclic anhydride, carboxyl, carbalkoxy carbaroxy or SO_3H group, are polycondensed at temperatures in the range from 0° to 450° C., said polycondensation being carried out with 0.1 to 40 mol % of formic acid based on the isocyanate compound employed and in the presence of at least one solvent selected from the group consisting of N-methyl pyrrolidone and dimethyl acetamide.

4,187,366

AMIDE-MODIFIED URETHANE ACRYLATE RADIATION CURABLE COMPOUNDS DERIVED FROM CONDENSATION REACTION PRODUCTS OF CARBOXYL AND ISOCYANATO GROUPS

Charles B. Friedlander, Glenshaw, and John C. McMullen, Pittsburgh, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 28, 1978, Ser. No. 891,426

Int. Cl.[2] C08G *18/34, 18/32, 18/62*

U.S. Cl. 528—75 **27 Claims**

1. Addition polymerizable compound comprising the reaction product of

(a) carboxylic acid containing at least one carboxyl functional group;

(b) polyisocyanate; and

(c) polyfunctional compound containing at least one hydroxyl group which is reactive with an isocyanato group of said polyisocyanate and which polyfunctional compound provides at least one ethylenic functional group in said reaction product; wherein said addition polymerizable compound contains

(d) at least one amide group formed by reaction of a carboxyl group of said carboxylic acid with an isocyanato group of said polyisocyanate; and

(e) at least one urethane group formed by reaction of a hydroxyl group of said polyfunctional compound with an isocyanate group of said polyisocyanate.

4,187,367

EPOXY RESINS WITH IMPROVED ADHESION AND PEEL STRENGTH

Harold G. Waddill, Austin, Tex., assignor to Texaco Development Corporation, White Plains, N.Y.

Filed Mar. 27, 1978, Ser. No. 890,749

Int. Cl.[2] C08G *59/56, 59/60*

U.S. Cl. 528—94 **24 Claims**

1. An epoxy resin composition having superior adhesion properties and being the cured product of a curable admixture which comprises:

a vicinal polyepoxide having an average of at least 1.8 reactive 1,2-epoxy groups per molecule;

a polyether diureide having a molecular weight of about 2000 to 3000 and

an aminopropyl derivative of a polyoxyalkylenepolyamine.

4,187,368

PROCESS FOR PRODUCING POWER-LIKE FURAN RESIN

Ildgam A. Bekbulatov, ulitsa Kashkarskaya, 215; Juldash Mamatov, ulitsa Pushkina, 50, kv. 60; Gennady D. Varlamov, ulitsa Jubileinaya, 5, kv. 13; Shavkat Madaliev, ulitsa Yarmazar, 361, and Valery M. Gaibov, ulitsa Turgeneva, 19, kv. 44, all of Fergana, U.S.S.R.

Filed Jun. 26, 1978, Ser. No. 919,279

Claims priority, application U.S.S.R., Jun. 29, 1977, 2513610; Aug. 2, 1977, 2517037; Apr. 5, 1978, 2593551

Int. Cl.[2] C08G *8/02, 8/06, 8/28*

U.S. Cl. 525—503 **10 Claims**

1. A process for producing a powder-like furan resin comprising heating of the starting components, viz. a ketone of the furan series and phenolformaldehyde resin taken in amounts ensuring a weight ratio therebetween of 10:3–15 respectively, to a temperature within the range of from 130° to 200° C.

4,187,369

PROCESS FOR PRODUCING HYDROCARBON-PHENOL-FORMALDEHYDE RESIN

Rudolf Z. Pavlikov, Nizhny Tagil; Natalya V. Shorygiiia, Moscow; Vladimir A. Strupinsky, Nizhny Tagil; Anatoly A. Kruglikov, Nizhny Tagil; Jury G. Farbshtein, Nizhny Tagil, and Iosif L. Klipinitser, Moscow, all of U.S.S.R.

Continuation of Ser. No. 813,769, Jul. 7, 1977, abandoned. This application Sep. 6, 1978, Ser. No. 940,641

Int. Cl.[2] C08G *14/14*

U.S. Cl. 528—137 **3 Claims**

1. A process for producing a hydrocarbon-phenol-formaldehyde resin comprising a continuous polycondensation of the anthracene fraction of coal tar boiling at a temperature within the range of from 270° to 350° C., phenol and formaldehyde at a weight ratio between said components of 1:3–4:1–1.2 respectively, in the presence of 0.5 to 1.2% by weight of an acidic catalyst at a supply rate of a mixture of said components of from 500 to 550 g/hr.

4,187,370

POLYMERIZATION AND RECOVERY OF 2-PYRROLIDONE WITH ACID TREATMENT

Byron E. Anshus, Orinda; Kiyoshi Katsumoto, El Cerrito, and Ira M. Serkes, Berkeley, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 792,421, Apr. 29, 1977, Pat. No. 4,139,696. This application Oct. 17, 1977, Ser. No. 842,758
Int. Cl.[2] C08G *69/24*
U.S. Cl. 528—312 12 Claims

1. A process for the polymerization of pyrrolidone, which comprises polymerizing under substantially anhydrous conditions a mixture containing alkaline catalyst, pyrrolidone, and solvent, to form a substantially anhydrous reaction product mixture consisting essentially of particulate poly-2-pyrrolidone, alkaline catalyst and solvent and, before said poly-2-pyrrolidone can appreciably agglomerate, treating said reaction product mixture with an acid to reduce the pH of the resulting mixture to about from 5 to 8.

4,187,371

FORMATION OF TEREPHTHALAMIDE POLYMER OF 5-METHYL-1,9-NONANEDIAMINE

Robert W. Campbell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 255,553, May 22, 1972, Pat. No. 3,904,677. This application Aug. 8, 1975, Ser. No. 603,220
Int. Cl.[2] C08G *69/28*
U.S. Cl. 528—340 24 Claims

1. A process which comprises contacting terephthalic acid and a diamine in a medium at substantially room temperature to thereby form a semi-solid slurry of the resulting salt in said medium within a few minutes, said medium consisting essentially of methanol and water wherein the volume ratio of methanol to water in said medium during the formation of said salt is in the range of about 99:1 to about 80:20; the weight ratio of the total of acid and diamine to said medium is in the range of about 1:1 to about 1:3, and utilizing the thus formed salt to produce a normally solid, moldable polyterephthalamide.

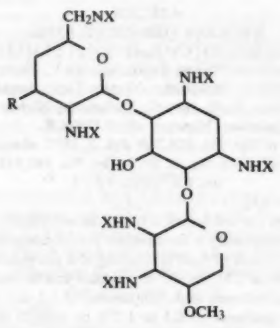
4,187,372

SELDOMYCIN FACTOR 5 DERIVATIVE

Ronald E. Carney, Gurnee; James B. McAlpine, and Thomas J. Perun, both of Libertyville, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Sep. 8, 1976, Ser. No. 721,613
Int. Cl.[2] C07H *15/22*
U.S. Cl. 536—17 R 9 Claims

1. A compound of the formula:



wherein R is a member of the group consisting of H, and

wherein Y is a member of the group consisting of lower alkyl, lower aryl, imidazolyl and wherein X is an amine protecting group and the pharmaceutically acceptable salts thereof.

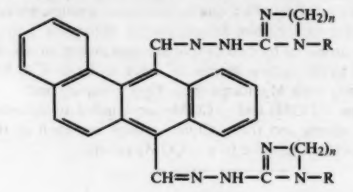
4,187,373

NOVEL DIHYDROBENZANTHRACENE DERIVATIVES

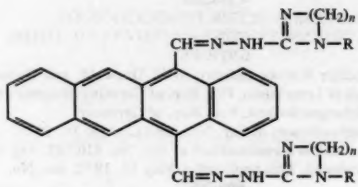
Ralph G. Child, Pearl River; Stanley A. Lang, Jr., Stony Point; Ving J. Lee, Airmont, and Yang-i Lin, Nanuet, all of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 2, 1978, Ser. No. 947,976
Int. Cl.[2] C07D *233/56, 239/20*
U.S. Cl. 542—402 10 Claims

1. A compound selected from the group consisting of those of the formulae:



(I)



(II)

wherein n is 2, 3, 4 or 5 and R is hydrogen or alkyl having from 1 to 4 carbon atoms and the pharmaceutically acceptable acid-addition and quaternary ammonium salts thereof.

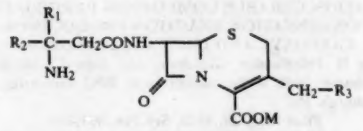
4,187,374

7-(β-AMINOACYLAMINO)-3-SUBSTITUTED-3-CEPHEM-4-CARBOXYLIC ACID DERIVATIVES AND PREPARATION THEREOF

Kunihiko Tanaka, Toyonaka; Masaru Kurita, Takatsuki, and Osamu Nishiwaki, Sakai, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Division of Ser. No. 396,580, Sep. 12, 1973, Pat. No. 4,094,872. This application Mar. 24, 1978, Ser. No. 889,637
Claims priority, application Japan, Nov. 17, 1972, 47-115983; Feb. 14, 1973, 48-18636
Int. Cl.[2] C07D *501/36, 501/22*
U.S. Cl. 544—28 9 Claims

1. Compounds of the formula:



wherein

R_1 is hydrogen, lower alkyl (C_{1-6}) phenyl or a thienyl,

R_2 is hydrogen, or

R_1 and R_2 taken together with the carbon to which they are attached is a cycloalkyl (C_{5-7}) group,
R_3 is hydrogen or lower alkylthio (C_{1-6}), and
M is hydrogen or a nontoxic, pharmaceutically acceptable cation,
provided that R_3 is lower alkylthio (C_{1-6}) when R_1 is phenyl.

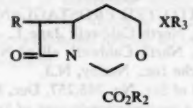
4,187,375

PROCESS FOR PREPARING OXAZINE RING COMPOUNDS

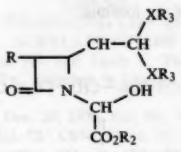
Thomas F. Buckley, Albany, Calif., and John G. Gleason, Delran, N.J., assignors to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 913,181, Jun. 6, 1978, Pat. No. 4,162,250, which is a division of Ser. No. 822,774, Aug. 8, 1977, Pat. No. 4,122,262, which is a continuation-in-part of Ser. No. 721,251, Sep. 8, 1976, Pat. No. 4,089,956. This application Oct. 27, 1978, Ser. No. 955,294
Int. Cl.[2] C07D *265/04*
U.S. Cl. 544—92 **2 Claims**

1. The method of preparing a compound of the formula:



in which R is a blocked amino, X is thio or oxy, R_2 is a carboxyl blocking group and R_3 is lower alkyl comprising reacting in an inert solvent at about room temperature with a catalytic source of protons a compound of the formula:



in which R, R_2, X and R_3 are as defined above.

4,187,376

REMOVAL OF CONTAMINANTS FROM CYANURIC ACID REACTION PRODUCT

Ronald H. Carlson, Willingboro, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Sep. 22, 1977, Ser. No. 835,653
Int. Cl.[2] C07D *251/32*
U.S. Cl. 544—192 **11 Claims**

1. In a process for producing cyanuric acid wherein a compound selected from the group consisting of urea and biuret is heated in an inert solvent to a temperature of at least about 180° C. under a subatmospheric pressure of from about 0 to about 250 mm. of Hg., wherein a reaction mixture (i) comprising cyanuric acid, from about 0.01 to about 5 percent by weight of said compound or of a mixture (ii) of urea and biuret, and inert solvent is obtained, and wherein cyanuric acid substantially free of said compound and of said mixture (ii) of urea and biuret is recovered from said reaction mixture (i), the improvement which comprises

distilling said reaction mixture (i) at a temperature of from about 150° C. to about 250° C. and at a pressure of from about 70 to about 170 mm of Hg., and collecting a distillate therefrom comprising not more than 60% by volume of said inert solvent together with said compound or a mixture of urea, biuret and cyanuric acid produced therefrom in distillation, and

recovering from the remaining reaction mixture said cyanuric acid contained therein.

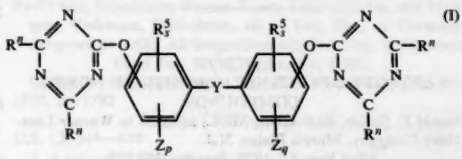
4,187,377

HALOGEN-CONTAINING S-TRIAZINE COMPOUND

Shigeyuki Narisawa; Shohei Yoshida, and Hiroshi Kawahara, all of Yokohama, Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

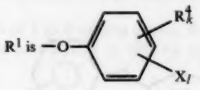
Filed Jun. 17, 1977, Ser. No. 807,636
Int. Cl.[2] C07D *251/30*
U.S. Cl. 544—219 **6 Claims**

1. A flame retardant which comprises a halogen-containing s-triazine compound having the formula

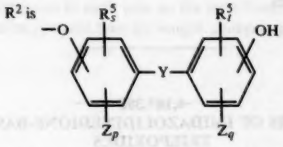


(I)

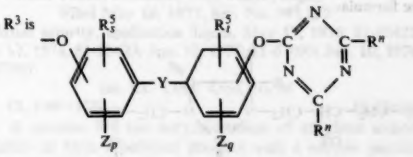
wherein R^n is OH, R^1, R^2 or R^3;



wherein:
R^4 is a lower alkyl group or a lower haloalkyl group;
X is Br or Cl
k, l=0 or an integer of 1 to 5;
$k+l \leqq 5$



wherein
R^5 is a lower alkyl group or a lower haloalkyl group:
Z is Br or Cl
Y is a lower alkylene, a lower haloalkylene group, or —SO_2, —SO—, —S—, —O—, —CO— or direct bond



wherein R^n, R^5, Z, Y, are as defined above; and throughout
p, q=0 or an integer from 1 to 4;
s, t=0 or an integer from 1 to 4;
$p+q+s+t \leqq 8$
$l+p+q \geqq 2$.

4,187,378

PREPARATION OF PYRIDYL-4-PHOSPHONATES

Derek Redmore, Ballwin, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Dec. 15, 1975, Ser. No. 640,537
Int. Cl.[2] C07D *213/04*
U.S. Cl. 546—21 9 Claims

1. A process of preparing a pyridyl-4-dihydrocarbon phosphonate unsubstituted in a 2-position which comprises reacting in an inert solvent a phosphite compound (A) which is a metallic salt of a phosphite dihydrocarbon diester or is a trialkyl phosphite with compound (B) which is an aromatic hydrocarbon N-substituted pyridinium salt unsubstituted in the 4-position and at least one of the two 2-positions, the said pyridinium salt being sterically hindered for reaction at a 2-position with said compound (A) by a sterically hindering bulky N-substituent which is a sufficiently bulky group to prevent substitution in the 2-position of the pyridine ring of compound (B).

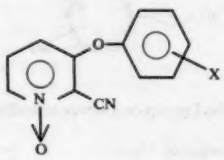
4,187,379

3-ARYLOXY-2-PYRIDINECARBONITRILE 1-OXIDE COMPOUNDS

Donald E. Butler, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Nov. 13, 1978, Ser. No. 959,802
Int. Cl.[2] C07D *213/57*
U.S. Cl. 546—288 7 Claims

1. A compound of the formula



where X is hydrogen, chlorine or lower alkoxy and is in the o or m positions.

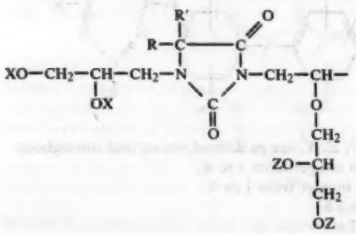
4,187,380

ESTERS OF IMIDAZOLIDINEDIONE-BASED TRIEPOXIDES

J. Alden Erikson, Gibsonia; Ronald J. Lewarchik, Natrona Heights, and William J. Birkmeyer, Oakmont, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 10, 1978, Ser. No. 950,097
Int. Cl.[2] C07D *233/72*
U.S. Cl. 548—310 10 Claims

1. An ester of imidazolidinedione-based triepoxide having the formula:



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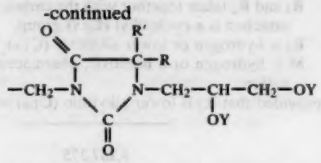


wherein R and R′ are independently hydrogen or hydrocarbon groups having from 1 to 8 carbons atoms, one X is hydrogen, one Y is hydrogen, one Z is hydrogen and the other X, Y and Z are

where the R″ groups are independently hydrocarbon groups having from 1 to 17 carbon atoms.

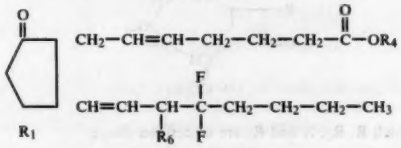
4,187,381

16-SUBSTITUTED PROSTAGLANDINS

George W. Holland, North Caldwell; Jane L. Jernow, Verona, and Perry Rosen, North Caldwell, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 745,257, Dec. 8, 1976, Pat. No. 4,112,225, which is a continuation-in-part of Ser. No. 683,576, May 5, 1976, abandoned, which is a continuation-in-part of Ser. No. 480,458, Jul. 18, 1974, Pat. No. 4,052,446, which is a continuation-in-part of Ser. No. 386,117, Aug. 6, 1973, abandoned. This application Nov. 2, 1977, Ser. No. 847,881
Int. Cl.[2] C07C *177/00*
U.S. Cl. 560—121 4 Claims

1. A compound of the formula:



wherein R_4 is hydrogen or lower alkyl; R_1 is lower alkyl; R_6 is hydroxy, lower alkanoyloxy, benzoyloxy, tetrahydropyranyloxy, benzyloxy, benzhydryloxy, trimethylsilyloxy, trityloxy or 4-methoxy-5,6-dihydro-2H-pyranyloxy;

or enantiomers or racemates thereof.

4,187,382

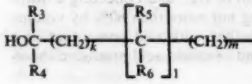
PROCESS FOR PRODUCING LOW COLOR RESIDUE ACRYLATE ESTER MONOMERS

Frank G. Cowherd, III, and Louis F. Theiling, Jr., both of Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 28, 1976, Ser. No. 755,062
Int. Cl.[2] C07C *69/54, 69/66*
U.S. Cl. 560—185 14 Claims

1. A process for producing a low color residue acrylate ester which comprises the steps of:

(a) pretreating an organic diol of the formula



-continued

wherein R_3, R_4, R_9 and R_{10} are selected from the group consisting of H, alkyl, aryl, cycloalkyl, substituted alkyl, substituted aryl and substituted cycloalkyl groups; R_5, R_6, R_7 and R_8 are selected from the group consisting of H, alkyl, aryl and cycloalkyl groups; and k, l, m, n, p and q are whole numbers having values from 0 to 5, by admixing it with from 3,000 ppm to 100,000 ppm, based on the weight of the organic diol, of triphenyl phosphite at a temperature of from 80° C. to 160° C.; then

(b) reacting said pretreated organic diol with a compound chosen from the group consisting of acrylic acid and methacrylic acid at a temperature of from 20° C. to 85° C. in contact with an esterification catalyst and from 50 ppm to 5,000 ppm, based on the weight of acrylic or methacrylic acid of a polymerization inhibitor chosen from the group consisting of monoalkyl ethers of hydroquinone having up to 10 carbon atoms in the alkyl segment and alkylated hydroxyanisoles having up to 10 carbon atoms in the alkyl segment.

4,187,383

PROCESS FOR PRODUCING LOW COLOR RESIDUE ACRYLATE ESTERS

Frank G. Cowherd, III, and Louis F. Theiling, Jr., both of Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 28, 1976, Ser. No. 755,046

Int. Cl.[2] C07C *69/54, 69/66*

U.S. Cl. 560—224 **8 Claims**

1. In an esterification process whereby acrylic or methacrylic acid is reacted with an organic polyol of the formula

wherein each R is hydrogen, alkyl of 1 to 8 carbon atoms, or cycloalkyl from 5 to 8 carbon atoms; each R′ is hydrogen, alkyl of 1 to 8 carbon atoms or —CH_2OH; K, m, and n are integers from 0 to 5; and Y is nothing or

wherein p, q, and r are integers from 0 to 5 and each R is as defined above, provided that when Y is nothing, m and n have values of at least 1 and each R′ is a substituent other than hydrogen, and provided further that when R′ is —CH_2OH, Y is nothing and m is 1, and wherein the acrylate or methacrylate ester product is recovered as a non-distillable residue, the improvement which comprises carrying out the esterification reaction at a temperature of from 20° C. to 80° C. with the reactants in contact with from 50 p.p.m. to 5,000 p.p.m., based on the weight of acrylic or methacrylic acid, of an alkoxy substituted phenolic or alkylated alkoxyphenolic polymerization inhibitor having up to 10 carbon atoms in the alkyl and alkoxy segments, to produce a product having a Gardner color of 4 or less.

4,187,384

PREPARATION OF MONO- AND POLY-ETHYLENE GLYCOL DIALKYL ETHERS

Rolf Platz, Mannheim; Werner Fuchs, Ludwigshafen, and Wolfgang Vodrazka, Freinsheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 10, 1979, Ser. No. 2,336

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1978, 2801793

Int. Cl.[2] C07C *41/06, 41/10*

U.S. Cl. 568—618 **1 Claim**

1. A process for the preparation of mono- and polyethylene glycol dialkyl ethers of the general formula I

$$R^1—O—(—CH_2—CH_2—O—)_n—R^2 \qquad I$$

where R^1 is alkyl of 1 to 4 carbon atoms, R^2 is alkyl of 3 to 5 carbon atoms and n is from 1 to 100, by reacting monoalkyl ethers II

$$R^1—O—(—CH_2—CH_2—O)_n—H \qquad II$$

with an olefin (III) which corresponds to the radical R^2, in the presence of an acid ion exchanger at from 1 to 200 bar and from 40° to 150° C., wherein the reaction is started at from 100° to 150° C. and the temperature is then lowered, in at least two approximately equal steps, to from 40° to 80° C., the temperature being dropped in each case to the next-lower level when the conversion per unit time no longer changes significantly.

4,187,385

PROCESS FOR THE POLYMERIZATION OF ETHYLENE OR ALPHA-OLEFINS AND CATALYST THEREFOR

Tetsuya Iwao, Zushi; Heizo Sasaki, Tokyo; Akira Ito, Yokohama, and Masahiro Kono, Manazuru, all of Japan, assignors to Mitsui Toatsu Chemical, Inc., Tokyo, Japan

Filed May 16, 1977, Ser. No. 797,227

Claims priority, application Japan, May 17, 1976, 51-55422; May 17, 1976, 51-55423; Jun. 10, 1976, 51-67092; Jun. 10, 1976, 51-67093

Int. Cl.[2] C08F *4/66, 10/06*

U.S. Cl. 526—128 **11 Claims**

1. A process for the polymerization of ethylene and/or α-olefins to form a polymer product with a narrow particle size distribution and a reduced amount of finely powdered polymer which comprises polymerizing ethylene and/or α-olefins with use of a catalyst comprising (A) a titanium component obtained by copulverizing in the substantial absence of an inert solvent at a temperature in the range of −30° to 150° C. for from 1 to 100 hours the starting titanium component of

Ziegler solid catalysts comprising titanium trichloride, or its compositions, or titanium tetrachloride, or its compositions, supported on a solid carrier and an organoluminum compound of the formula,

$$Al\,R_m\,X_{3-m}$$

wherein R is alkyl or aryl, X is hydrogen or halogen and m is 1 to 3, together with ethylene or α-olefins in an amount between about 0.01 and 10% by weight of said starting titanium component, and (B) an organoaluminum component, said catalyst having a narrow particle size distribution, a reduced amount of finely powdered catalyst having a size of less than 5μ in a diameter, and high catalyst activity, wherein said copulverizing with said ethylene or said α-olefin permits the particle size of said titnaium catalyst to be controlled.

4,187,386

CYCLIZATION OF 1,5-HEXADIENE TO CYCLOHEXENE

George D. Lockyer, Jr., Snyder; Dennis E. Burd, Kenmore; Richard F. Sweeney, Elma; Bernard Sukornick, Williamsville, all of N.Y., and Harry E. Ulmer, Morristown, N.J., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Dec. 29, 1978, Ser. No. 974,397

Int. Cl.[2] C07C *13/20*

U.S. Cl. 585—367 **19 Claims**

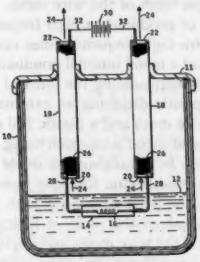
1. The method for the production of cyclohexene which comprises contacting, 1,5-hexadiene with a mixture of a first catalyst selected from the group consisting of chromium oxides, chromium chlorides, chromium bromides, molybdenum oxides, molybdenum chlorides, molybdenum bromides, tungsten oxides, tungsten chlorides, tungsten bromides, iron oxides, cobalt oxides, nickel oxides, elemental sulfur, SiO_2, Al_2O_3, vanadium metal, vanadium oxides and VOF_3, and mixtures thereof, and a second catalyst selected from a tin (IV) halide and mixtures thereof.

4,187,387

ELECTRICAL LEAD FOR CRYOGENIC DEVICES

Jerome F. Parmer, San Diego, Calif., assignor to General Dynamics Corporation, San Diego, Calif.

Filed Feb. 26, 1979, Ser. No. 15,270
Int. Cl.[2] H01B *12/00*
U.S. Cl. 174—15 CA 3 Claims



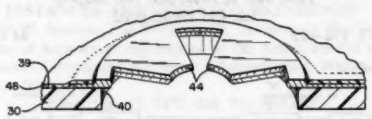
3. In a container holding a cryogenic liquid, an electrical lead for supplying current to an electrical device immersed in said cryogenic liquid comprising, a vent made of an electrical and thermal insulating material, said vent disposed above said cryogenic liquid and leading from said container, an electrical conductive ribbon folded into a plurality of folds and fitted in said vent to define a plurality of chambers within said vent, said ribbon shaped to form a plurality of holes interconnecting each of said chambers through which boil-off gas from said cryogenic liquid cascades in heat exchange relationship with said folded ribbon.

4,187,388

CIRCUIT BOARD WITH SELF-LOCKING TERMINALS

Joseph A. Roberts, Hudson, N.H., assignor to Advanced Circuit Technology, Merrimack, N.H.

Division of Ser. No. 808,808, Jun. 22, 1977, Pat. No. 4,107,836.
This application Apr. 21, 1978, Ser. No. 898,623
Int. Cl.[2] H05K *1/10*
U.S. Cl. 174—68.5 12 Claims



1. A circuit board assembly of the type adapted for solderless attachment thereto of components by their leads to said board, and comprising in combination:

(A) rigid, dielectric panel having at least one aperture formed between opposite surfaces thereof;

(B) at least one electrically conductive circuit formed of a resiliently flexible metal, rigidly affixed at least in part to a surface of said dielectric panel, said electrically conductive circuit having (i) at least one integral termination which essentially surrounds said at least one aperture in said panel, said termination including (ii) a plurality of spaced fingers (a) disposed inwardly for a distance from edge areas of said aperture, and (b) adapted for locking mating with said component leads; and

(C) an apertured, flexible, dielectric material fixedly attached at least in part to said surface so as also to cover said at least one conductive circuit at least in part, with its apertures positioned over said apertures in said rigid, dielectric panel;

said integral termination, and said fingers having areas of cross-sectional thickness greater than the cross-sectional thickness of said electrically conductive circuit, said termination including a peripheral shoulder area (i) of reduced cross-section thickness and (ii) a plan area greater than said apertures in (a) said rigid, dielectric panel, and (b) said flexible, dielectric material, said peripheral shoulder being fixedly attached to said dielectric panel at least in part; and

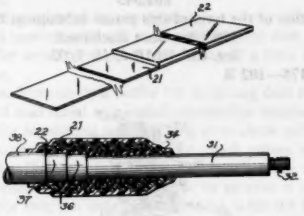
said flexible dielectric material overlaying and fixedly attached at least in part to said termination peripheral shoulder area.

4,187,389

SHIELDED ELECTRICAL CONDUCTOR TERMINATIONS AND METHODS OF MAKING SAME

George A. Foote, Kendall Park; Mason M. Lindamood, Basking Ridge, and Robert D. Fulcomer, Milford, all of N.J., assignors to Sola Basic Industries, Inc., Milwaukee, Wis.

Continuation of Ser. No. 567,440, Apr. 11, 1975, abandoned.
This application Feb. 24, 1977, Ser. No. 771,658
Int. Cl.[2] H02G *15/02, 1/14;* B32B *7/00;* H01B *1/04*
U.S. Cl. 174—73 R 8 Claims



5. Method of preventing corona-induced failure at a terminal of a high voltage shielded electrical conductor, the conductor being covered on the exterior thereof by an insulator and said insulator being covered on the exterior by a conductive shield which terminates short of the end of said insulator with a length of the surface of said insulator being exposed beyond the end of the conductive shield, comprising the step of winding a high voltage insulating tape member around the end portion of said conductive shield and around said insulator surface proximate to the end of said conductive shield, said high voltage insulting tape member being capable of applying compressive force to said terminal, said high voltage insulating tape member having a corona-resistant electrical stress-relieving elastomeric material bonded to a portion of the length of one side of said insulating tape member, said insulating tape member being wound such that said stress-relieving elastomeric material underlies said tape member in contact with said end portion of the conductive shield and in contact with said insulator surface proximate to the end of said conductive shield, said winding progressing in one direction along said end portion of said conductive shield and said insulator surface unitl said stress-relieving material is exhausted.

6. In a high voltage electrical terminal having an electrical conductor covered on the exterior thereof by an insulator and wherein said insulator is covered on the exterior by a conductive shield which ends short of the end of said insulator with a length of the surface of said insulator extending beyond the end of said conductive shield, a corona-resistant stress-relieving termination for said terminal comprising: a flexible high voltage insulating tape member, a layer of cold-flowable corona-resistant electrical stress-relieving elastomeric material bonded to at least a portion of one side of said tape member, said tape member being wrapped in overlapping relationship about the end portion of said conductive shield and also about the surface of said insulator beyond the end of said conductive shield with said layer of cold-flowable elastomeric material underlying said tape member in direct contact with the end portion of the conductive shield and in direct contact with the insulator

surface beyond the end of said conductive shield, said tape member after being wrapped thereon applying continuing compressive force to the underlying stress-relieving material for cold-flowing said elastomeric material about the surface of said insulator and for providing self-mending capability, and said elastomeric material containing from about 350 to about 600 parts by weight per hundred parts of elastomeric material of a semi-conductor powder in which the voltage when measured at various currents in a cylindrical column of powder 1-inch in diameter packed at a pressure of 400 pounds per square inch is in accordance with the equation: $I=kV^n$ wherein the value of "n" exceeds about 2.

4,187,390

POROUS PRODUCTS AND PROCESS THEREFOR

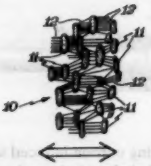
Robert W. Gore, Newark, Del., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Continuation of Ser. No. 637,298, Dec. 3, 1975, abandoned, which is a division of Ser. No. 376,188, Jul. 3, 1973, Pat. No. 3,953,566, which is a continuation of Ser. No. 39,753, May 21, 1970, abandoned. This application Jun. 21, 1977, Ser. No. 808,545

The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.

Int. Cl.[2] H01B *7/18, 9/02*

U.S. Cl. 174—102 R **77 Claims**



Direction of Uniaxial Expansion

1. A porous material consisting essentially of highly crystalline polytetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils and has a matrix tensile strength in at least one direction above about 7,300 psi.

4,187,391

HIGH FREQUENCY COAXIAL CABLE AND METHOD OF PRODUCING SAME

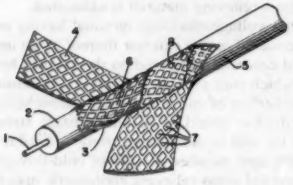
Othmar Voser, Möriken, Switzerland, assignor to Kupferdraht-Isolierwerk Ag Wildegg, Wildegg, Switzerland

Filed Jan. 10, 1978, Ser. No. 868,418

Claims priority, application Switzerland, Jan. 12, 1977, 372/77

Int. Cl.[2] H01B *11/06*

U.S. Cl. 174—106 R **13 Claims**



1. A high frequency coaxial cable for aerial and ultra-high-frequency lines, comprising a metal internal conductor, a plastic dielectric concentrically surrounding the internal conductor, an external conductor surrounding the dielectric and comprising a metal wire mesh and a plastic foil strip metallised on at least one side, and a plastic sheath enveloping the external conductor as an external protective cover, the wires of said wire mesh being arranged in netlike configuration to define an open wire mesh deposited on the dielectric and said plastic foil strip being applied on the wire mesh in helical edgewise overlapping windings with said metallised side facing the wire mesh and being pressed into each single mesh of the wire mesh in the form of a generally trough-like dent thereby short-circuiting each single mesh of the wire mesh.

12. A method of producing a high frequency coaxial cable for aerial and ultra-high-frequency lines comprising the steps of applying around a metal internal conductor a plastic dielectric concentrically surrounding the internal conductor, applying around said plastic dielectric an external conductor comprising a metal wire mesh and a plastic foil strip metallised on at least one side, said metal wire mesh being applied in form of an open wire mesh by arranging the wires thereof in netlike configuration and said plastic foil strip being applied on said mesh by winding the plastic foil strip with its metallised side facing the wire mesh in the form of helical edgewise overlapped windings on the wire mesh, and applying on said windings of the metallised plastic foil strip a plastic sheath as an external protective cover by extrusion under pressure of sufficient magnitude as to press the metallised plastic foil into each single mesh of the netlike wire mesh in the form of a generally trough-like dent and to fill these trough-like dents with material of the plastic sheath thereby providing the internal surface of the plastic sheath with generally knob-shaped projections fitting into said trough-like dents.

4,187,392

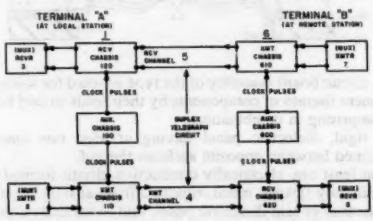
SYNCHRONOUS UNIVERSAL BINARY SCRAMBLER

Laurance F. Safford, Washington, D.C., assignor to American Standard Inc., New York, N.Y.

Filed Jun. 8, 1962, Ser. No. 200,995

Int. Cl.[2] H04L *9/02*

U.S. Cl. 178—22 **44 Claims**



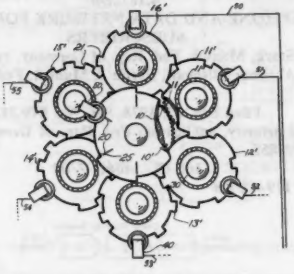
1. A synchronous binary cryptographic system responsive to an input synchronous telegraph signal comprising means for generating timing pulses of substantially fixed, predetermined frequency, means for generating a synchronous binary cryptographic key in synchronism with timing pulses applied thereto by said means for generating timing pulses, switch means actuated by a predetermined input signal sequence for applying the timing pulses to said means for generating the binary cryptographic key, said cryptographic key generating means being continuously responsive to said timing pulses during operation of the system and means for combining said input signal with the cryptographic key.

4,187,393

KEY GENERATOR

Eugene R. DeWeese, Jr., 1531 Queens Ct., Claremont, Calif. 91711, and Lynn W. Marsh, Jr., 1106 N. Garfield St., Boston, Mass. 02114

Filed Aug. 23, 1955, Ser. No. 530,216
Int. Cl.[2] G09C 5/00; H04L 9/04
U.S. Cl. 178—22 **3 Claims**



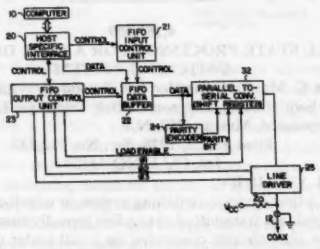
2. An apparatus for producing a substantially noncyclic sequence of binary electric values, including a driving gear, a plurality of driven gears associated with said driving gear, each of said driven gears having a pattern disc carried thereby, each said dics having a plurality of radial slots in its periphery, means for utilizing the slots of each said disc to produce a sequence of binary electric values, means for substantially combining pairs of sequences so produced, value by value, to produce a lesser number of new sequences of binary electric values, and means for combining said new sequences in pairs, value by value.

4,187,394

HIGH-SPEED DATA LINK FOR MODERATE DISTANCES AND NOISY ENVIRONMENTS

Michael W. Sievers, Van Nuys, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 25, 1978, Ser. No. 899,828
Int. Cl.[2] H04L 5/14; H04J 6/00
U.S. Cl. 178—58 R **10 Claims**



1. A full duplex data link for coupling a first digital system at one site to a second digital system at a remote site in noisy environments for digital communication over two channels, one channel for communication in each direction, comprising

a module at each system, each module having a submodule for transmitting data and a submodule for receiving data, and means for each submodule for interfacing the submodule with the site system, each submodule of a module being connected to the site system through said interfacing means, a transmitting submodule comprising

an input control unit and an output control unit,

a first-in-first-out data buffer for receiving data from said system under control of said input control unit commanded by the site system through said transmitting submodule interfacing means, and for putting out data, one parallel n-bit word at a time, under control of an output control unit commanded by the site system through said transmitting module interfacing means,

means for converting each n-bit word into a train of n bit pulses, and

means for digital frequency modulating said train of n-bit pulses over one of said channels for transmission to a receiver submodule at the site of the other system, said digital frequency modulating means producing on said channel one clock pulse followed by a data pulse for every bit **1** of said n-bit word, and one clock pulse followed by no data pulse for every bit **0** of said n-bit word,

and a receiving submodule comprising

an input control unit and an output control unit,

means for serial-to-parallel conversion of a train of n data pulses,

a first-in, first-out data buffer for receiving data from said one of said serial to parallel conversion means, and

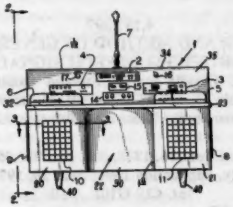
means for separating and delaying data clock pulses from said train of n data pulses, said clock pulses being delayed sufficiently for their use to synchronize said serial-to-parallel converting means to receive n data bits, and for every n data bits beginning with the first data bit, to enable transfer to said first-in-first-out data buffer a data word under control of said input control unit for subsequent transfer into said site system under control of said output control unit.

4,187,395

STEREO SOUND RECORDING AND REPRODUCTION APPARATUS

Robert G. Hewson, Jr., 204 Concord Dr., Harleysville, Pa. 19438

Filed May 23, 1978, Ser. No. 908,645
Int. Cl.[2] H04R 5/02
U.S. Cl. 179—1 GA **6 Claims**



1. An integrated, self-contained stereophonic sound recording and reproduction system housed within a console, said console comprising a front desk-like component and a rear storage component, said system including

(a) a pair of stationary spaced-apart speaker cabinets, each cabinet containing a speaker mounted rotatably internally of the cabinet,

(b) a horizontal surface supported by and extending between the speaker cabinets and mounting at least one turntable,

(c) an open three dimensional space located between the two speaker cabinets and below the horizontal surface,

(d) said speaker cabinets, horizontal surface and open space constituting the desk-like component of the console,

(e) support means disposed above the horizontal surface for mounting a plurality of operably connected component parts of the sound recording and reproduction system,
(f) said component parts including
(1) a microphone,
(2) at least one record/play unit,
(3) an amplifier,
(4) a mixer and
(5) volume control means, and
(g) at least one hollow compartment constituting the rear storage component, said compartment having access means for permitting storage therein and including support means for mounting component parts of the sound recording and reproduction system.

4,187,396
VOICE DETECTOR CIRCUIT

Gabriel J. Luhowy, Lima, N.Y., assignor to Harris Corporation, Cleveland, Ohio

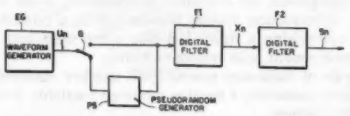
Filed Jun. 9, 1977, Ser. No. 804,868
Int. Cl.[2] G10L *1/00*
U.S. Cl. 179—1 SC **7 Claims**

1. Apparatus for detecting the voice content of an audio signal, comprising slew-rate limited amplifier means responsive to said audio signal to provide an impulse noise limited audio signal, and having a maximum slew-rate selected such that said amplifier means is substantially transparent to the voice content of said audio signal, however, impulse noise components of said audio signal are substantially attenuated thereby, and voice detector means responsive to said impulse noise limited audio signal for determining the voice content of said signal and providing a first output indication thereof, wherein said voice detector means includes syllabic-rate means for determining the average syllabic-rate content of said impulse noise limited audio signal and for providing a first signal in accordance therewith, threshold means for supplying a threshold signal, and comparator means for comparing said first signal and said threshold signal for providing said first output indication having a value in accordance with said comparison.

4,187,397
DEVICE FOR AND METHOD OF GENERATING AN ARTIFICIAL SPEECH SIGNAL

Giulio Modena, Caselle-Torino; Stefano Sandri, Turin, and Carlo Scagliola, Caselle-Torino, all of Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A., Turin, Italy

Filed Jun. 16, 1978, Ser. No. 916,356
Claims priority, application Italy, Jun. 20, 1977, 68420 A/77
Int. Cl.[2] G10L *1/10*
U.S. Cl. 179—1 SG **8 Claims**

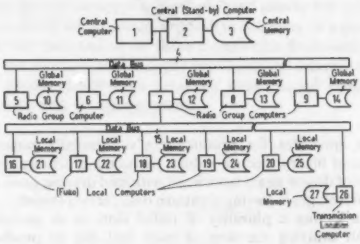


1. A method of producing a simulated voice signal for measuring the performance of voice-transmitting equipment, comprising the steps of:
generating a periodic waveform whose frequency components substantially correspond to those produced, within a predetermined frequency range, by glottal excitation of the vocal tract;
converting said periodic waveform into an intermediate signal in which the amplitudes of said frequency components are substantially equalized; and
transforming said intermediate signal into an output signal in which the amplitudes of said frequency components correspond substantially to those of the voice spectrum in said predetermined frequency range.

4,187,398
TELEPHONE AND DATA NETWORK FOR MOBILE SUBSCRIBERS

Anselm Stark, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Feb. 21, 1978, Ser. No. 879,212
Claims priority, application Fed. Rep. of Germany, Mar. 7, 1977, 2709855
Int. Cl.[2] H04Q *7/00*
U.S. Cl. 179—2 EB **5 Claims**



1. In a telephone and data network for mobile subscribers of the type wherein radio concentrators are locally distributed in the overall area of a radio network and can communicate by radio with mobile subscribers, and radio exchange offices are associated with one or more radio concentrators and are connected to the public communication system which may include telephone, teleprinter and data transmission networks, the improvement therein comprising:
a local memory operative to store, for interrogation, the call number and area code of the location of each mobile subscriber in a smaller area within the overall larger area; and a global memory operatively associated with a plurality of said memories and storing, for interrogation, the date on the prevailing location of each mobile subscriber in the larger overall area.

4,187,399
CALL STATE PROCESSOR FOR A TIME DIVISION SWITCHING SYSTEM

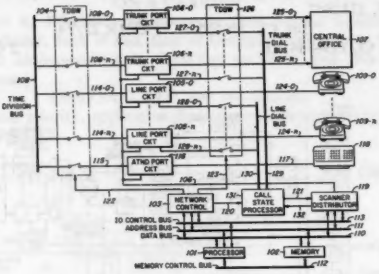
Thomas G. Maxfield, Boulder, and Ronald K. Witmore, Lafayette, both of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jun. 5, 1978, Ser. No. 912,833
Int. Cl.[2] H04Q *11/04*
U.S. Cl. 179—15 BY **23 Claims**

1. In a time division switching system in which communication signals are transmitted over a first time division bus system between port circuits connected on a call under control of a system controller, each call served by said system being assigned to a unique time slot in a series of cyclically recurring time slots, said switching system further comprising the combination of:
a second time division bus system connected to said port circuits,
means effective during each occurrence of a time slot to which a call currently being served by one of said port

circuits is assigned for applying hook state information signals from said one port circuit to said second bus system,

means responsive to the application of said hook state signals to said second bus system for generating output messages specifying call state information for the calls to which said



hook state signals pertain, each message being unique to a single call,

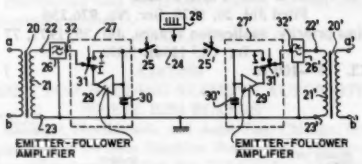
and means for transmitting each generated message to said system controller to control the serving of calls by said system, each of said messages including information specifying the identity of the time slot to which the call represented by each message is assigned.

4,187,400

TIME-DIVISION MULTIPLEX COMMUNICATION SYSTEM FOR CONNECTING TWO-WIRE LINE CIRCUITS IN TIME-DIVISION MULTIPLEX

Gilbert M. M. Ferrieu, Bievres, France, assignor to Telecommunications Radioelectriques et Telephoniques TRT, Paris, France

Filed Mar. 16, 1978, Ser. No. 887,434
Claims priority, application France, Mar. 21, 1977, 77 08404
Int. Cl.[2] H04J *3/00*
U.S. Cl. 179—15 AA **5 Claims**



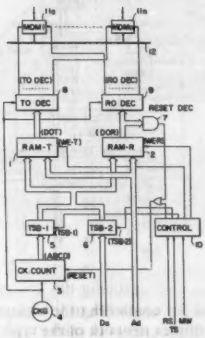
1. A time-division multiplex communication system for connecting two-wire line circuits, comprising a single wire two-way time-division multiplex bus, and connecting apparatus comprising a primary switching means for periodically connecting each line circuit to said bus during a predetermined time period of a multiplex frame, storage means responsive to said primary switching means for storing an information signal present on said bus during said predetermined time period, amplifier means connected to said storage means for providing an output signal corresponding to the stored information signal, and secondary switching means operating in sychronization with said primary switching means for disconnecting the output of said amplifier means from an output terminal of said connecting apparatus for the entire predetermined time period and for connecting the output of said amplifier to the output terminal of said connecting apparatus for the remainder of said multiplex frame.

4,187,401

METHOD OF CONTROLLING CHANNEL ASSIGNMENT IN A TIME DIVISION MULTIPLEXING NETWORK

Jun Matsumoto, Chiryu, Japan, assignor to Aiphone Co., Ltd., Nagoya, Japan

Filed May 25, 1978, Ser. No. 909,669
Claims priority, application Japan, Jun. 6, 1977, 52-66547
Int. Cl.[2] H04J *3/00*
U.S. Cl. 179—15 BW **1 Claim**



1. In a method for controlling the channel assignment of a time division multiplex network of the type that interconnects a large number of subscribers with one another through a selected smaller number of time division channels and includes a time division multiplex communication path to which the subscribers are each connected via individual modulation/demodulation circuits for modulating an analog signal to a pulse signal when transmitting the analog signal to said communication path and for demodulating the pulse signal to the analog signal when receiving the pulse signal from the communication path, the improvement comprising the steps of:

assigning each time division multiplex channel, in a sequential manner, to a particular subscriber addressor/addressee pair who presently desire to communicate or are communicating with one another along the communication path, the addressor and the addressee of each so-assigned channel each identified by subscriber address-data which corresponds to the respective modulation/demodulation circuit of the addressor or addressee;

storing, in a channel-by-channel sequence, the suoscriber address-data of the addressor or the addressee of the so-assigned channels in successive addressable storage locations of a circulating read/write memory;

storing reset data in a storage location of said circulating memory following the last storage location that contains subscriber address-data;

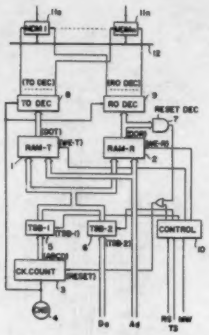
reading-out, in sequence, the subscriber address-data from each storage location in said circulating memory and using the read-out subscriber address-data for gating the particular modulation/demodulation circuit corresponding to the read-out subscriber address-data; and

reading-out the reset data and using the reset data to repeat said reading-out of the subscriber address-data step.

4,187,402
METHOD OF CONTROLLING CHANNEL ASSIGNMENT IN A TIME DIVISION MULTIPLEXING NETWORK

Jun Matsumoto, Chiryu, Japan, assignor to Aiphone Co., Ltd., Nagoya, Japan

Filed May 25, 1978, Ser. No. 909,689
Claims priority, application Japan, Jun. 6, 1977, 52-66548; Jun. 6, 1977, 52-66549
Int. Cl.[2] H04J 3/00
U.S. Cl. 179—15 BW 2 Claims



1. In a method for controlling the channel assignment of a time division multiplex network of the type that interconnects a large number of subscribers to each other through a selected smaller number of time division channels and includes a time division multiplex communication path to which the subscribers are each connected via individual modulation/demodulation circuits for modulating an analog signal to a pulse signal when transmitting the analog signal to said communication path and for demodulating the pulse signal to the analog signal when receiving the pulse signal from the communication path, the improvement comprising the steps of:

assigning each time division multiplex channel, in a sequential manner, to a particular subscriber addressor/addressee pair who presently desire to communicate or are communicating with one another along the communication path, the addressor and the addressee of each so-assigned channel each identified by subscriber address-data which corresponds to the respective modulation/demodulation circuit of the addressor or addressee;

storing, in a channel-by-channel sequence, the subscriber address-data of the addressor of each so-assigned channel in successive addressable storage locations in a transmission side read/write memory and the subscriber address-data of the addressee of each so-assigned channel in corresponding, successive storage locations in a reception side read/write memory;

storing reset data in a storage location in either said transmission side or said reception side memory following the last storage location that contains subscriber address-data;

reading-out, simultaneously and in sequence, the corresponding storage locations in said memories by addressing successive storage locations in response to a clock count;

decoding the subscriber address-data read-out from the transmission side memory and the subscriber address-data read-out from the reception side;

supplying the decoded subscriber address-data, as a sampling synchronous pulse, to the particular modulation/-demodulation circuits corresponding to the read-out subscriber address-data;

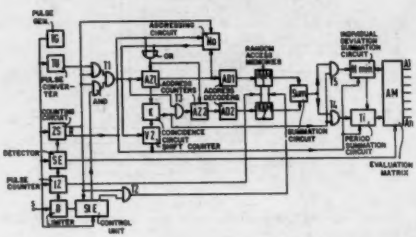
reading-out the reset data; and

resetting the clock count in response to said reset data.

4,187,403
VOICE-PROTECTED, FREQUENCY-SELECTIVE SIGNAL RECEIVER

Reinhold Ast, Unterpfaffenhofen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Mar. 15, 1978, Ser. No. 886,957
Claims priority, application Fed. Rep. of Germany, Mar. 23, 1977, 2712847
Int. Cl.[2] H04M 1/50; G01R 23/14
U.S. Cl. 179—84 VF 2 Claims



1. A voice-protected, frequency-selective signal receiver for telecommunications systems, in which the received signals comprise simultaneously occurring and beating individual frequencies forming a beat frequency analog sum signal, comprising:

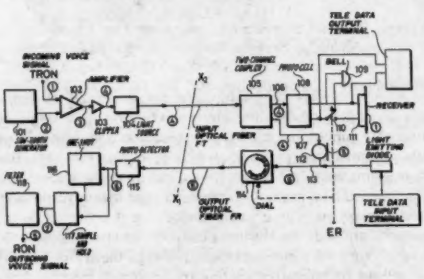
means for converting said beat frequency analog sum signal into a digital signal of positive and negative pulses of equal amplitude with the duration of the individual pulses being equal to the spacings of the respective two successive zero crossings of the beat frequency analog sum signal; and

means for determining the period duration of the pulses of the digital signal, including means for determining the time interval between two pulses of the same polarity and the same duration.

4,187,404
TELEPHONE SET FOR OPTICAL FIBERS LINES

Pierre Deman, and Luigi d'Auria, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Jul. 20, 1978, Ser. No. 926,234
Claims priority, application France, Jul. 25, 1977, 77 22757
Int. Cl.[2] H04B 9/00
U.S. Cl. 179—100 R 7 Claims



1. A telephone set for receiving from an input optical fiber an input optical signal and for emitting on an output optical fiber an output optical signal comprising:

a two-channel coupler for dividing said input optical signal into first and a second parts;

a photovoltaic cell for converting said first part in an electrical signal;

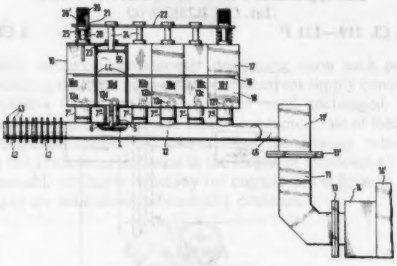
a receiver actuated by said electrical signal;
a microphone diaphragm for receiving and directly modulating with acoustic waves said second part and delivering said output optical signal.

4,187,405

DEVICE FOR FUSING AND FIXING A TONER IMAGE ON A CARRIER

Herbert A. Püschner, Schwanewede, and Helmut Lembens, Wiesbaden, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 7, 1977, Ser. No. 840,245
Claims priority, application Fed. Rep. of Germany, Oct. 9, 1976, 2645765
Int. Cl.² H05B *9/06*
U.S. Cl. 219—10.55 A **48 Claims**



1. A device for fusing and fixing a toner image on a carrier of predetermined web width by means of an electromagnetic radiation field, comprising means for generating microwave energy; and means coupled to said generating means for radiatively transmitting said microwave energy uniformly across the web width of said carrier, said carrier being movable relative to said transmitting means, said transmitting means comprising:
a plurality of discrete transmitting elements arranged in at least two rows, one of said rows lying behind the other in the running direction of said carrier; and
a network of waveguides coupled to said generating means for distributing said microwave energy to said discrete transmitting elements.

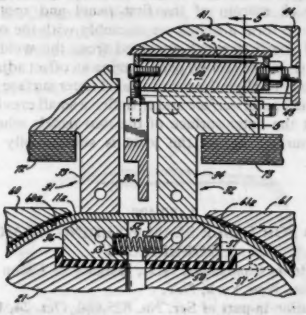
4,187,406

MACHINE FOR WELDING SEAMS IN AUTOMOTIVE WHEEL RIM BLANKS

Vernon R. Fencl, Northbrook, and Aujit Tan, Chicago, both of Ill., assignors to Grotnes Machine Works, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 722,428, Sep. 13, 1976, abandoned. This application Jun. 28, 1978, Ser. No. 920,075
Int. Cl.² B23K *11/02*
U.S. Cl. 219—59.1 **16 Claims**

1. A welding machine for welding the longitudinal seams in wheel rim blanks which have been rolled into cylinders with the longitudinal edges of each blank forming the weld zone for said longitudinal seam, said machine comprising the combination of
a pair of clamping assemblies each including an inside member and an outside member for engaging the inner and outer surfaces, respectively, of the rim blank adjacent the longitudinal edges thereof on opposite sides of said weld zone so as to align said longitudinal edges with each other, at least one of said clamping assemblies being movable relative to the other clamping assembly in a direction transverse to said weld zone so as to permit the longitudinal edges of the rim blank to be pressed against each other while the blank is clamped on both sides of said weld zone,
means for urging said inside and outside members of said clamping assemblies against the respective inner and outer surfaces of the rim blank,
said movable clamping assembly including bearing means supporting both the inner and outer clamping members to permit sliding movement of said clamping members on said bearing means without any relative movement between said clamping members and the rim blank clamped therebetween,
means independent of said clamping assemblies for engaging the outside surface of the rim blank on opposite sides of



said weld zone and pressing the longitudinal edges of the rim blank together in the transverse direction to press said longitudinal edges of the rim blank together during the welding thereof,
and means for passing an electric welding current through said clamping assemblies and transversely through the longitudinal edges of the rim blank to effect the welding of said longitudinal edges while said edges are continuously pressed together and while the rim blank is continuously clamped on both sides of said weld zone to maintain said edges in alignment with each other.

4,187,407

WELDED LAP JOINT AND METHOD OF MAKING THE SAME

John J. Marko, Jr., Roseville, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 5, 1978, Ser. No. 939,416
Int. Cl.² F16B *11/00*; B23K *11/10*
U.S. Cl. 219—91.2 **3 Claims**

1. A method of forming a welded lap joint in sheet metal panels to form a substantially uninterrupted outer surface across the joint comprising the steps of:
positioning a metal spacer strip along the edge of a first panel on the back surface and spaced from said edge thereof,
bending the margin of the first panel from the plane of the outer panel surface back against the spacer strip to form a U-shaped section with the spacer strip crimped inside the U-shaped section,
forming the margin of the second panel in an offset substantially parallel to the outer panel surface and spaced from the plane of the second panel surface by an amount equal to the thickness of the U-shaped section of the first panel,
assembling the second panel margin to the bent back-first panel margin by overlapping the margins so that the outer surfaces of the first and second panels are substantially

coplanar and spaced by a small crevice, and joining the panels by welding the panel margins together so that the outer surface of the first panel is separated from the weld by the spacer strip and is substantially free of weld marks.

3. A welded lap joint of two sheet metal panels presenting a substantially uninterrupted surface across the joint comprising

an edge of a first panel having three layers of sheet metal including a panel margin bent back toward the under surface of the panel and a sheet metal spacer strip sandwiched between the margin and the under surface of the panel,

a second panel having an edge thereof lying flat against the bent back margin of the first panel and spot welded thereto to form a four layer assembly with the outer surface of the first panel separated from the welds by the spacer strip, the second panel having an offset adjacent the first panel to align the second panel outer surface with the first panel outer surface and to define a small crevice in the joint at the outer surface of the two panels wherein the outer surface across the joint is substantially uninterrupted.

4,187,408

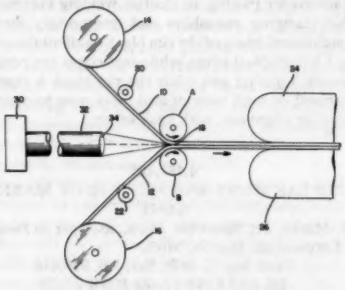
METHOD FOR LASER SEAM WELDING OF MOVING WORKPIECES

Robert F. Heile, Chappaqua, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 625,480, Oct. 24, 1975, abandoned. This application Apr. 20, 1977, Ser. No. 788,452

Int. Cl.² B23K 9/00

U.S. Cl. 219—121 LM **8 Claims**



1. A method for continuous seam welding of at least two thin flexible strips of sheet material composed of a highly conductive metal selected from the group consisting of aluminum, copper and brass, having a thickness in the range of from about 0.001 to about ¼ inch, while the strips are moving at a relatively high rate of speed of at least about 100 feet per minute, comprising the steps of:

(a) directing the moving strips toward one another to form a converging Vee between the moving strips;

(b) providing a pair of pressure rollers;

(c) passing the moving strips between the pair of pressure rollers;

(d) applying a force of above zero pounds against the moving strips with the pair of pressure rollers at a location contiguous to the point at which the moving strips converge such that the moving strips overlay one another in intimate contact at the point of convergence;

(e) generating a laser beam of energy;

(f) providing an optical medium for focusing said laser beam;

(g) focusing said laser beam with said optical medium to produce a converging beam of laser energy having a predetermined focal length; and

(h) directing said converging beam of laser energy into said converging Vee with its focal point located substantially about said point of convergence, the focal length of said converging beam being chosen in relation to the diameter of said pressure rollers such that when said converging beam is directed into said converging Vee said beam impinges upon the moving strips in the vicinity of the converging Vee closest to said point of convergence so as to minimize energy losses due to reflection and absorbed heat and to optimize the amount of energy that is available at said point of convergence for welding said strips together while moving at said high rate of speed.

4,187,409

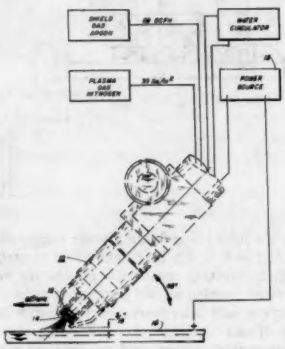
APPARATUS FOR AND METHOD OF PLASMA PRE-WELD AND POST-WELD METAL PREPARATION

Norbert G. Slater, Pascagoula, Miss., assignor to Everett Greer and John F. Bryan, III, both of Pascagoula, Miss., part interest to each

Continuation of Ser. No. 660,211, Feb. 23, 1976, abandoned. This application Feb. 3, 1978, Ser. No. 874,737

Int. Cl.² B23K 9/00

U.S. Cl. 219—121 P **1 Claim**



1. The method of pre-weld and post weld preparation of metal plate with plasma arc torch having a tip with cylindrical plasma passageway and comprising the steps of:

(a) flaring outwardly the tip end of said cylindrical plasma gas passageway in an axial angle of divergence of 90 degrees plus or minus 10 degrees;

(b) ionizing an inert gas in an arc stream between said tip and metal plate that responsive to said axle angle of divergence, forms a short thick plasma jet; and

(c) passing said short thick plasma jet over said metal plate in any set comprising a wide range of working parameters, ie work angle, speed of travel, standoff, power density and gas flow, for producing stabilized gouges in said metal plate, the consistency of said stabilized gouges being dependent on said axial angle of divergence as limited in said top plasma passageway, and the physical dimensions of said gouges being dependent on said working parameters.

4,187,410

METHOD OF MULTI-PASS NARROW GROOVE ARC WELDING

Nikolai A. Eroshkin; Alfred V. Ivannikov; Vyacheslav N. Matveev, all of Leningrad, and Anatoly I. Sergienko, Moscow, all of U.S.S.R., assignors to Vsesojuzny Nauchno-Issledovatelsky, Proektno-Konstruktorsky i Tekhnologichesky Institut Elektrosvarochnogo Oborudova, Leningrad, U.S.S.R.

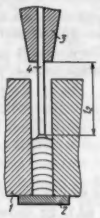
Filed Mar. 10, 1977, Ser. No. 776,198

Int. Cl.² B23K 9/00

U.S. Cl. 219—137.2 **3 Claims**

1. A method of multi-pass arc welding with a consumable electrode in a protective atmosphere for welding heavy-gauge

metal with narrow grooving comprising: placing a current supply conductor which supports the consumable electrode passing therethrough above said narrow grooving which will form the welded joint, and adjusting the initial length of extension of the consumable electrode to be greater than the thickness of said heavy-gauge metal which corresponds to the depth of said narrow grooving of the welded joint, conducting the welding plural passes with the length of extension of the consumable electrode continuously decreasing upon each pass, maintaining the vertical position of the current supply conductor relative to the top surface of said metal unchanged, the voltage applied to the current supply conductor, rate of feed of the consumable electrode and welding speed being reduced with the continuous decrease in the length of extension of the consumable electrode, whereby the current and voltage in the arc gap are maintained substantially constant.



4,187,411

ARC WELDING

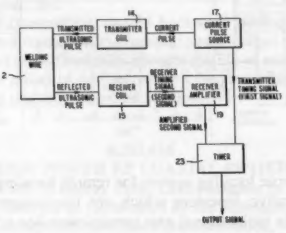
Graham W. Bryce, Giffnock, and Joseph J. Hunter, East Kilbride, both of Scotland, assignors to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Oct. 18, 1977, Ser. No. 843,187

Claims priority, application United Kingdom, Oct. 25, 1976, 44150/76

Int. Cl.[2] B23K 9/10

U.S. Cl. 219—137.2 **16 Claims**



1. Welding apparatus comprising a welding torch, means for substantially continuously feeding a strip of consumable weld filler material through said welding torch during the course of a welding operation, and means for monitoring the stick-out distance of said strip of consumable weld filler material beyond the tip of said welding torch while said strip is in motion through said torch, said monitoring means comprising

means for transmitting a pulse in the form of an ultrasonic sound disturbance along said moving strip;

means for providing a first signal at an instant corresponding to the passage of the pulse past a first station separated from the welding torch tip by a fixed path length of said moving strip;

means for providing a second signal at an instant corresponding to the passage past a second station of the pulse reflected from the free end of said moving strip, the second station being separated from the welding torch tip by a fixed path length of the strip;

and means responsive to the time interval between the first and second signals for providing a measure of the magnitude of the stick-out distance of said moving strip of weld filler material.

4,187,412

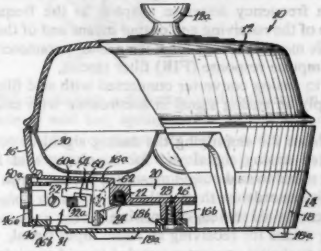
AUTOMATIC CONTROL FOR ELECTRIC HEATING DEVICE

Peter J. Ernster, Glendale; Ernest Canamero, Appleton, and James B. Cockroft, Wauwatosa, all of Wis., assignors to Sunbeam Corporation, Chicago, Ill.

Filed Jul. 10, 1978, Ser. No. 922,936

Int. Cl.[2] F27D 11/02

U.S. Cl. 219—441 **5 Claims**



1. An electric heating appliance comprising a metal vessel, an electric heating element electrically insulated from and in intimate heat exchange relationship with said vessel, a slide switch connecting said heating element to a source of electric energy, said slide switch including a housing having fixed and movable contacts contained therein, said movable contacts being supported by a switch actuator having a switch knob projecting from said housing and linearly movable between an open circuit position and a closed circuit position, said switch knob being normally biased to said open position, means for manually moving said slide switch to the closed position, a latch mounted adjacent to said slide switch for engaging said switch knob when said switch is moved to the closed position to hold said slide switch in such closed position, and means responsive to the attainment of a predetermined temperature of said vessel for releasing said latch.

4,187,413

HEARING AID WITH DIGITAL PROCESSING FOR: CORRELATION OF SIGNALS FROM PLURAL MICROPHONES, DYNAMIC RANGE CONTROL, OR FILTERING USING AN ERASABLE MEMORY

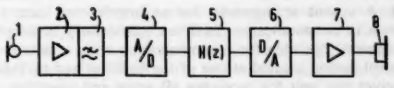
Ludwig M. Moser, Estenfeld, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Apr. 7, 1978, Ser. No. 894,348

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1977, 2716336

Int. Cl.[2] H04R 25/00

U.S. Cl. 179—107 FD **10 Claims**



1. A method for adapting the transmission function of a hearing aid to various types of hearing difficulty, characterized in that the analog sound signal to be transmitted is converted

into a digital signal, is then subjected to a discrete signal processing based on selected stored parameters matched to the difficulty in hearing for which provision is to be made, that the digital signal is then converted back into an analog electrical signal and is converted into sound in a manner known in the case of hearing aids, characterized in that several input signals are individually converted to digital signals, and are correlated in a digital arithmetic unit to provide a resultant output.

2. A hearing aid system comprising

receiving means for receiving an audio signal,

output means comprising a transducer for producing an auditory signal,

an analog to digital converter coupled to said receiving means and operative to supply a converted signal in digital form in accordance with the audio signal,

discrete signal processing means connected with said analog to digital converter and comprising a finite impulse response (FIR) filter circuit for processing an input signal in accordance with said converted signal to provide a filtered signal with a frequency response adapted to the frequency response of the receiving and output means and of the ear, and erasable memory means for storing filter parameters for said finite impulse response (FIR) filter circuit,

a digital to analog converter connected with said filter circuit to supply an analog signal in accordance with said filtered signal, and

circuit means for amplifying the analog signal to provide an amplified analog signal and for supplying said amplified analog signal to said output means for producing an auditory signal in accordance therewith.

3. A hearing aid system comprising

receiving means for receiving an audio input signal,

an analog to digital converter coupled to said receiving means for supplying a converted signal in digital form in accordance with said audio input signal,

memory means connected with said analog to digital converter and having an input-output characteristic to supply a translated signal in accordance with said converted signal but with each input digital value translated into an output digital word, the input-output characteristic of said memory means serving to adjust the dynamic range of the audio input signal without introducing time delay, said memory means comprising an erasable memory for storing input-output characteristic values for providing said input-output chacteristic,

a digital to analog converter coupled with said memory means to supply an analog signal with adjusted dynamic range in accordance with the translated signal,

circuit means to amplify and process the analog signal, and

transducer means responsive to the amplified and processed analog signal for producing an audio output signal.

4,187,414

CIRCUIT ARRANGEMENT FOR AN INTERFERENCE DATA ALARM SYSTEM IN COMMUNICATION FACILITIES, PARTICULARLY IN TELEPHONE EQUIPMENT

Franz Fahrenschon, Neuried; Heinz Huettl, Wolfratshausen, and Ewald Dotzauer, Sauerlach, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

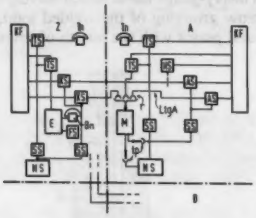
Filed Mar. 23, 1978, Ser. No. 889,260

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1977, 2713937

Int. Cl.[2] G08B *29/00*; H04M *11/00*

U.S. Cl. 179—175.3 S **7 Claims**

1. A circuit arrangement for an interference data alarm system in communication facilities, particularly in telephone equipment, operable for communication with a maintenance control station located at one of the facilities and including a receiver test unit for receiving all error and condition messages, which are determined and transmitted by transmitting test units of unmanned secondary stations, characterized in the circuit arrangement comprising means for inserting the transmitting test unit (M) of each of the secondary station (A, B) into lines (Ltg1, Ltg2) used for normal telecommunication traffic with the one facility (Z), in which the maintenance control station (E, Bn, FS) is located, and comprising devices forming part of the transmitting test unit (M) which are operable independently of the switching equipment (e.g. AS, KF) of the secondary station (A), to independently undertake the connecting preparation and the transmission of the messages via said lines (Ltg1, Ltg2).



4,187,415

REMOTE LOCATING SYSTEM FOR TRANSMISSION FAULTS IN DATA TRANSMISSION LINE HAVING REGENERATIVE REPEATERS

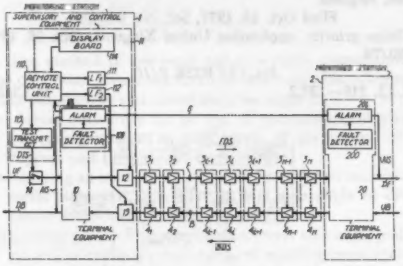
Patrick E. Boutmy, and Jean-Marc A. Camborde, both of Lannion, France, assignors to Etat Francaise, Issy-les-Moulineaux and Societe Anonyme de Telecommunications, Paris, both of, France

Filed Jun. 5, 1978, Ser. No. 912,727

Claims priority, application France, Jun. 20, 1977, 77 18879

Int. Cl.[2] H04B *3/46*

U.S. Cl. 179—175.3 F **5 Claims**



1. A remote locating system for remote locating the N pairs of regenerative repeaters which are interconnected by line sections of a bidirectional data transmission line which is interconnected between a monitoring station and a monitored station, said bidirectional data transmission line comprising;

a forward transmission channel, having forward transmission regenerative repeaters, conveying in the forward direction from said monitoring station to said monitored station a first data signal, and

a backward transmission channel, having backward transmission regenerative repeaters, conveying in the backward direction from said monitored station to said monitoring station a second data signal; said monitoring and monitored stations comprising:

means in each of said stations for detecting transmission faults on said backward and forward transmission channels; and

means in each of said stations for producing first and second alarm signals in response to the detection of a transmission fault on said backward and on said forward transmission

channels respectively; said monitoring station also comprising:

a first means for continuously generating a first low frequency signal in said forward direction on said forward transmission channel in response to said first alarm signal, said first low frequency signal being mixed with said first data signal; and

a second means for generating a second low frequency signal in said forward direction on said backward transmission channel, after said first low frequency signal is produced; said second low frequency signal being modulated by at most (N−1) pulses and being mixed with said first data signal on said backward transmission channel when a forward transmission regenerative repeater is connected to a backward transmission regenerative repeater:

said forward transmission regenerative repeater of each said regenerative repeater pair comprising:

means for detecting said first low frequency signal, and

means for transmitting said first low frequency signal on said forward transmission channel to the next forward transmission regenerative repeater; and said backward transmission regenerative repeater of each said regenerative repeater pair comprising;

means for detecting a first pulse of said second low frequency signal which is transmitted from the preceding backward transmission regenerative repeater in said forward direction on said backward transmission channel;

means for connecting the output terminal of said forward transmission regenerative repeater to the input terminal of said backward transmission regenerative repeater in response to said detection of said first low frequency signal by said first low frequency signal detecting means,

while disconnecting said input terminal of said backward transmission regenerative repeater of one pair and the output terminal of the backward transmission regenerative repeater of the next pair;

means for disconnecting said output terminal of said forward transmission regenerative repeater of said pair from said input terminal of said backward transmission regenerative repeater of said pair in response to said detection of said first pulse of said second low frequency signal by said first pulse detection means;

while connecting said input terminal of said backward transmission regenerative repeater of said pair and said output terminal of said backward transmission regenerative repeater of the next pair; and

means for transmitting in said backward direction on said backward transmission channel to said output terminal of said backward transmission regenerative of said next pair, only the pulses of said second low frequency signal which succeed said first detected pulse.

4,187,416

HIGH POWER RF COAXIAL SWITCH

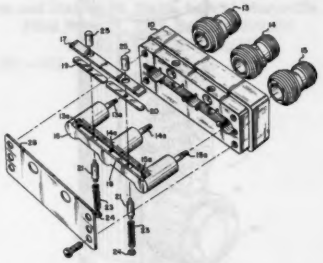
Edward R. Caro, Monterey Park, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation of Ser. No. 835,419, Sep. 21, 1977, abandoned. This application Oct. 10, 1978, Ser. No. 949,886

Int. Cl.[2] H01P *1/10;* **H01H** *13/10*

U.S. Cl. 200—153 S **11 Claims**

1. A coaxial switch comprising RF switch conductors, a metal enclosure for said switch conductors, and a solid dielectric completely surrounding said conductors within said metal enclosure, said dielectric electrically isolating said conductors and said metal enclosure to eliminate any space through which electrons may be accelerated to cause secondary emission by collision with said metal enclosure, wherein said switch is for connecting the center conductors of coaxial connectors having their outer conductors connected to said metal enclosure, said switch being comprised of at least two parallel conductors of coaxial connectors, said conductors being center conductors of said coaxial connectors and extending into said enclosure and dielectric, a movable elongated bar across said parallel conductors, an elongated cavity in said dielectric extending across said parallel conductors for said elongated bar to be moved out of contact with said parallel conductors, a transverse hole through said dielectric surrounding said parallel conductors and elongated bar, said transverse hole intersecting said cavity at the center of said bar in a direction normal to said bar and



said parallel conductors, a dielectric pushing means in said hole on one side of said bar, spring means biasing said dielectric pushing into said hole against said bar to move said bar away from said conductors, a dielectric plunging means in said hole on a side opposite said pushing means, and means for thrusting said plunging means in said hole into said bar and against said spring means to move said bar against said conductors.

4,187,417

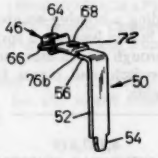
PRINTED CIRCUIT CONTACT

Joseph J. Zehel, Milwaukee, and Joseph W. Kreis, West Bend, both of Wis., assignors to Globe-Union Inc., Milwaukee, Wis.

Filed Feb. 2, 1978, Ser. No. 874,503

Int. Cl.[2] H01H *1/42, 21/54*

U.S. Cl. 200—254 **11 Claims**



1. A one piece printed circuit contact for attachment to an insulative substrate of an electrical control device, the contact being electrically conductive and comprising:

a body portion for attachment to said substrate, said body portion having opposite ends, opposite faces and longitudinal edges;

a first jaw integrally attached to one end of said body portion;

a jaw supporting tab in juxtaposition with one face of said body portion and integrally joined to one edge of said body portion;

a second jaw integrally attached to said jaw supporting tab and in parallel adjacent relationship with said first jaw, said first and second jaws forming a spring clip; and,

a tail integrally joined to the other end of said body portion and angularly disposed with respect to said body portion, said tail comprising a single material thickness and having an end defining a plug, and wherein the thickness of said tail is greater than the thickness of at least one of said jaws.

4,187,418

COMBINATION PEDESTRIAN SIGN AND PUSH BUTTON

Richard C. Harris, 30 Westwood Rd., Medford, Mass. 02155

Filed Jun. 30, 1978, Ser. No. 920,829

Int. Cl.[2] H01H *9/02*

U.S. Cl. 200—295 **3 Claims**

1. A combination sign and pushbutton mountable by separate flexible strapping bands to a cylindrical post for pedestrian control of traffic lights, comprising:

(a) a solid plaque,

(b) said plaque being formed with front and rear faces,

(c) said rear face being contoured in the form of a semi-cylindrical cavity to conform to the contour of said post,

(d) said front face being generally flat and formed with integral raised lettering providing an instructional legend for pedestrians,

(e) said plaque being formed at the upper and lower portions thereof with forwardly facing arcuate grooves generally concentric with the contour of said rear face and adapted to receive said flexible strapping bands wrapped about said post and along said grooves, and

(f) a pushbutton unit mounted to the front face of said plaque,

(g) said unit including a housing secured to said plaque, a switch mounted in said housing, a spring biased pushbutton extending through said housing and operatively connected to said switch, and means for connecting said switch to said lights.

4,187,419

ELECTRICAL SWITCH

John Warren, Colne, England, assignor to Lucas Industries Limited, Birmingham, England

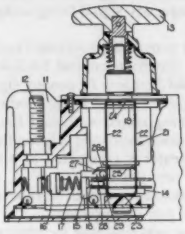
Filed Feb. 7, 1978, Ser. No. 875,925

Claims priority, application United Kingdom, Feb. 8, 1977, 5044/77

Int. Cl.[2] H01H *9/16*

U.S. Cl. 200—308 **6 Claims**

1. An electrical switch including a fixed electrical contact, a movable electrical contact, means for moving the movable contact into and out of engagement with the fixed contact, a first legend carried by a fixed part of the switch and indicative of one of the operative states of the switch, a second legend carried by a means for obscuring, movable relative to said fixed part and indicative of the other operative state of the switch, said means for obscuring being movable between a position wherein the first legend is revealed and the second legend is obscured and a position wherein said means for obscuring obscures the first legend and the second legend is revealed, resilient means urging said means for obscuring to one of said positions, releasable latch means for retaining said means for obscuring in the other of said positions against the action of said resilient means, release means for releasing said latch means at a predetermined point in the movement of the movable contact relative to the fixed contact and return means for returning the means for obscuring to said other position against the action of said resilient means.



4,187,420

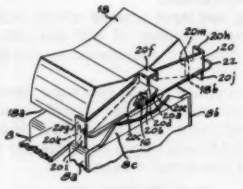
ROCKER SWITCH WITH SELECTIVE LOCKOUT MEANS SHIFTABLE TRANSVERSELY OF THE PIVOTAL AXIS

Earl T. Piber, Oconomowoc, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Filed May 17, 1978, Ser. No. 906,875

Int. Cl.[2] H01H *21/50, 21/06*

U.S. Cl. 200—321 **19 Claims**



1. A rocker switch with selective lockout means comprising:

a switch housing;

contact means mounted in said housing;

a rocker button pivotally mounted to said housing for actuating said contact means, said rocker button having a designated tilted position corresponding to a designated condition of said contact means; and

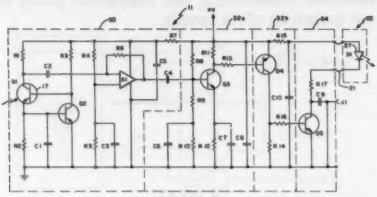
selective lockout means including mounting means therefor rendering the same shiftable transversely of the pivotal axis of said rocker button to a designated selective position for preventing rocking of said rocker button to said designated tilted position and thus lockout said designated condition of said contact means, said selective lockout means comprising a slider member having an interference ear portion protruding into the path of motion of said rocker button when said slider member is in said designated selective position, wherein said rocker button is pivotally mounted to said housing by means of a shaft, and wherein said mounting means comprises resilient means biasing said slider member into engagement with said shaft.

4,187,421

OPTICAL RELAY

Paul F. Key, San Martin, and Anthony R. Lazzara, Portola Valley, both of Calif., assignors to Scientific Technology Inc., Mountain View, Calif.

Filed Mar. 18, 1977, Ser. No. 778,883
Int. Cl.[2] H04B 9/00
U.S. Cl. 250—199 8 Claims



1. Apparatus for relaying a directional electromagnetic radiation beam containing pulse frequency components above a predetermined frequency, said apparatus comprising:

(a) movable means for receiving said radiation beams and producing a shaped electrical signal in response to and substantially in phase with said pulse frequency components, said receiving means being insensitive to electromagnetic pulse components below said predetermined frequency;

(b) electromagnetic radiation source driving means coupled to said receiving means for providing an electrical drive signal in response to and substantially in phase with said shaped signal;

(c) an electromagnetic radiation source coupled to said driving means and responsive to said drive signal for producing a pulsating output beam of electromagnetic radiation at substantially the same frequency as and substantially in phase with said received pulse frequency components; and

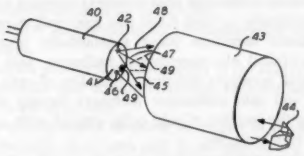
(d) means responsive to one of said electrical signals for producing an audio output signal having a frequency dependent upon said one signal and having a maximum amplitude when said receiving means is aligned with said beam said lastnamed means including means for producing said audio signal even if the frequency components are not within the audio range and a jack removably connectable in circuit with said receiving means.

4,187,422

INTERNAL REFERENCE FOR STELLAR TRACKER

Bart J. Zoltan, Old Tappan, N.J., assignor to The Singer Company, Little Falls, N.J.

Filed Dec. 5, 1977, Ser. No. 857,157
Int. Cl.[2] G01B 11/26
U.S. Cl. 250—203 R 7 Claims



1. A stellar tracking system comprising:

means for detecting the presence of a source of stellar light,

means for focusing said stellar light on said detecting means,

means on said detecting means indicating the orientation of said detecting means relative to a fixed position, and

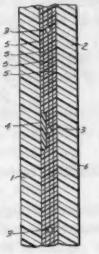
means responsive to said orientation means for indicating the deviation of said detecting means from said fixed position.

4,187,423

ARTICLE FOR MEASURING LOWER EXTREMITIES COMPRISING LAMINAE OF BOTH PVC AND ACRYLIC

Henry B. Ehrhardt, Arlington, Wash., assignor to Larry C. Petersen and Stanley M. Smith, both of Marysville, Wash.

Filed Mar. 27, 1978, Ser. No. 890,296
Int. Cl.[2] A61B 6/00, 6/12
U.S. Cl. 250—312 3 Claims



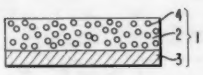
1. A lower extremity measuring article having a suitable surface area for a person to lay on, and permeable to X-ray with imbedded numerals and wires nonpermeable to X-ray used between a source of X-ray and X-ray film so as to produce a permanent image of numbered and parallel spaced lines on the film, the spacing of which corresponds to the measurements of a system of length, the article being made of acrylic plastic and polyvinyl chloride layers nonopaque to X-ray, and the numerals and wires being disposed between said layers and fused together under heat and pressure to form a laminated hermetically sealed structure nontoxic to humans and easily sterilized.

4,187,424

RADIOELECTROPHOTOGRAPHY PROCESS

Eiichi Inoue, Tokyo, and Takashi Yamaguchi, Kanagawa, both of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 18, 1977, Ser. No. 797,954
Int. Cl.[2] B41M 5/00
U.S. Cl. 250—315.1 9 Claims



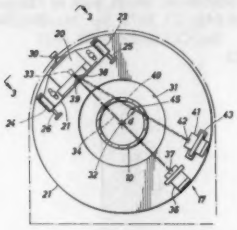
1. A process for radioelectrophotography, which comprises imparting a uniform electrostatic charge to the surface of a recording layer of an image-recording material containing dispersed therein many cells and/or pores with gas sealed therein so as to cause a sufficiently strong electric charge to act on the gas inside said cells and/or pores to substantially ionize said gas, and irradiating said recording layer with penetrating radiation carrying image information to imagewise remove the charge on the surface of said recording layer and form an electrostatic latent image, wherein the gas is selected from the group consisting of air, nitrogen, a halogen, oxygen, carbon dioxide, carbon monoxide, a rare gas, and mixtures thereof the size of said cells in said recording layer ranges from about 0.0025 mμ to about 100 mμ and the degree of porosity of said recording layer ranges from about 27 to about 85 volume %.

4,187,425

PIPE INSPECTION SYSTEMS

Carroll R. Thompson, Odessa, Tex., assignor to NDT Systems, Inc., Odessa, Tex.

Filed Apr. 14, 1978, Ser. No. 896,384
Int. Cl.[2] G01N *23/00*
U.S. Cl. 250—358 P **10 Claims**



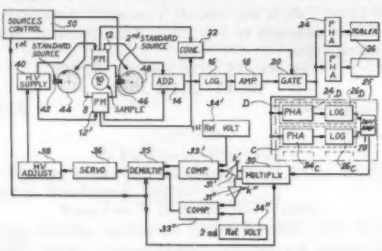
1. A method for radioactive inspection of a pipe member comprising the steps of:
- passing a beam of radiation through two wall segments of a pipe in a direction transverse to the axis of the pipe where the chord beam of radiation intersects a perpendicular radius for the outer wall of the pipe at a distance from the center axis which is a function of approximately 0.6 times the radius for the outer wall of the pipe;
- moving the pipe longitudinally and radially relative to the beam of radiation; and
- measuring the radioactivity transmitted through the wall segments as a function of angular and lengthwise positions of the pipe so as to provide a measure of pipe eccentricity.

4,187,426

LIQUID SCINTILLATION SPECTROMETRY PROCESS AND APPARATUS

Pierre Jordan, Carmenstr. 41, CH-8032 Zurich, Switzerland

Filed Mar. 24, 1978, Ser. No. 889,885
Int. Cl.[2] G01T *1/20*
U.S. Cl. 250—364 **19 Claims**



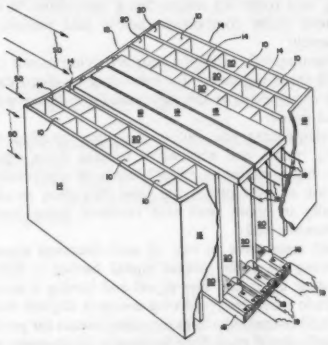
1. A liquid scintillation spectrometry process for samples having a quenching of the fluorescent efficiency resulting more particularly from colour quenching, wherein said colour quenching is measured by the folowing operations:
- a first standard solution is prepared having no colour quenching;
- this first standard solution is exposed to a first standard external scintillation source which emits fluorescent radiation;
- the radiation which has passed through the first standard solution is subject to spectrometry;
- once and for all, one of the characteristics of the spectrum obtained is recorded and this constitutes a reference characteristic;
- the first standard solution is replaced by one of the samples to be measured;
- the sample is exposed to radiation from the first standard source;
- the radiation which has passed through the sample is subject to spectrometry;
- the characteristic of the spectrum obtained is measured;
- the measured characteristic is compared with the recorded reference characteristic, said comparison giving the colour quenching of the sample.

4,187,427

STRUCTURE FOR COLLIMATED SCINTILLATION DETECTORS USEFUL IN TOMOGRAPHY

Dominic A. Cusano, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 9, 1978, Ser. No. 868,045
Int. Cl.[2] G01T *1/20*
U.S. Cl. 250—366 **12 Claims**



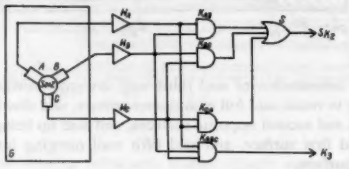
1. A scintillation detector for use in computerized tomography comprising:
- a front wall member with an internal and external surface, said front wall member being substantially transparent to supra-optical electromagnetic radiation and having its internal surface coated with an optically reflective material;
- a rear wall member with an internal surface and an external surface, said rear wall member being substantially parallel to said front wall member and having its internal surface coated with an optically reflective material;
- at least three collimator wall members oriented substantially perpendicular to said front and rear wall members, said collimator members being substantially impervious to supra-optical electromagnetic radiation, said collimator and wall members defining a plurality of cells with open ends and said collimator members having all surfaces facing the interior of said cells, coated with an optically reflective material;
- at least one scintillator body in each of said cells; and
- a plurality of photoelectrically responsive detector means each of which is disposed so as to receive optical radiation emitted by the scintillator material in a single cell so as to produce an electrical signal representative of the intensity of the spura-optical electromagnetic radiation impinging upon each of said cells.

4,187,428

METHOD AND APPARATUS FOR ABSOLUTE ACTIVITY DETERMINATION OF RADIONUCLIDES

Krzysztof K. Pochwalski, and Tomasz E. Radoszewski, both of Warsaw, Poland, assignors to Instytut Badan Jadrowych, Warsaw, Poland

Filed May 15, 1978, Ser. No. 906,343
Claims priority, application Poland, May 17, 1977, 198185
Int. Cl.[2] G01T *1/20*
U.S. Cl. 250—366 **7 Claims**



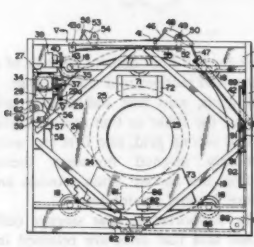
1. A method for the absolute activity determination of radionuclides comprising producing pulses from three photomultipliers optically coupled to a scintillator and to a radionuclide source to be measured, producing further pulses representing multiples of coincidence of the first said pulses and correlating the counts obtained from the further pulses of the various multiples of coincidence to obtain a measure of the absolute activity of the radionuclide source.

4,187,429

SCANNING APPARATUS FOR CROSS-SECTIONAL INSPECTION EQUIPMENT

Chuji Tomita, Tokyo, and Hiroshi Abe, Kashiwa, both of Japan, assignors to Hitachi Medical Corporation, Tokyo, Japan

Filed May 15, 1978, Ser. No. 906,278
Claims priority, application Japan, May 13, 1977, 52/55006; May 13, 1977, 52/55007
Int. Cl.[2] A61B *6/00*
U.S. Cl. 250—445 T **13 Claims**



1. A scanning apparatus, comprising:
a frame;
rollers rotatably secured on said frame;
a rotatable disc supported at its circumferential surface by said rollers;
a hollow drum provided in the vicinity of the rotation axis of said rotatable disc for the insertion therethrough of an object to be inspected;
an X-ray source and a detector arranged in positions opposed to each other with said drum intervening therebetween;
drive means for rotating said rotatable disc in a forward direction and in a reverse direction;
a striker provided on the rotatable disc;
two speed accelerating and reducing means movable alternately to a first position for engagement with said striker and to a second position for non-engagement with said striker; and
synchronizing means for bringing one of said two speed accelerating and reducing means to said first position in association with the forward rotation of said rotatable disc and for bringing the other one of said two speed accelerating and reducing means to said first position in association with the reverse rotation of said rotatable disc,
whereby said respective speed accelerating and reducing means are brought into engagement with said striker to perform braking the rotation and acceleration of speed of rotation of said rotatable disc.

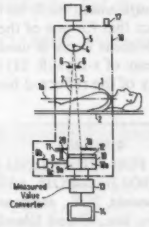
10. A scanning apparatus, comprising:
a frame;
rollers rotatably secured to said frame;
a rotatable disc supported at its cicumferential surface on said rollers;
a hollow drum provided in the vicinity of the rotation axis of said rotatable disc for the insertion therethrough of an object to be inspected;
an X-ray source and a detector which are mounted on said rotatable disc in positions opposed to each other with said drum intervening therebetween;
drive means for driving said rotatable disc to make at least one whole revolution; and
guide means for guiding a cable extending from equipment including said X-ray source and said detector which are mounted on said rotatable disc,
said guide means comprising:
a guide panel movably mounted on said frame;
a weight plate movably mounted on said frame; and
a rope having one end fixed to said drum and releasably wound around this drum and having the other end connected to said weight plate and engaged with said guide panel so as to allow said weight plate to move said guide panel in a certain direction,
said cable being releasably wound around said drum in a direction opposite to that in which said rope is wound therearound and being engaged with said guide panel and being led out to the outside of the apparatus.

4,187,430

TOMOGRAPH FOR THE PRODUCTION OF TRANSVERSE LAYER IMAGES

Martin Schmidt, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 5, 1978, Ser. No. 939,461
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1977, 2744226
Int. Cl.[2] G03B *41/16*
U.S. Cl. 250—445 T **1 Claim**



1. A tomographic apparatus for the production of transverse layer images of a radiography subject with a radiation measuring arrangement comprising a radiation source which produces a fan-shaped beam of rays penetrating the radiography subject, whose cross-sectional extent, perpendicular to the layer plane, is equal to the layer thickness, and which is of sufficient extent in the layer plane that the entire radiography

subject is penetrated, and comprising a radiation receiver which determines the radiation intensity behind the subject, a rotating device for the measuring arrangement for irradiating the radiography subject from different directions, and a measured value converter for the transformation of the signals delivered by the radiation receiver into a layer image, wherein the radiation receiver consists of a number of individual detectors, wherein the radiation receiver has two or more mutually parallel and adjacently arranged detector rows, each of which is assigned to a specific body region and corresponds in its length to the width of the body region assigned to it, wherein the number of detectors per unit of length of one detector row is greater the shorter the detector row, wherein a control device is present for the radiation receiver which renders possible the selective detection of the x-ray beam by one detector row in each case, and wherein one collimator with laminae aligned with respect to the radiation source is disposed before each detector series, characterized in that after each of the collimators (11, 12) for each of the detector rows (9, 10) as viewed in the radiation direction the radiation receiver has one light -and airtight chamber (29, 30) with a partition (35, 37) made of radiation-absorbing material between the chambers (29, 30) and the two collimators (11, 12).

4,187,431

METHOD FOR THE ADJUSTMENT OF A SEMICONDUCTOR DISC RELATIVE TO A RADIATION MASK IN X-RAY PHOTOLITHOGRAPHY

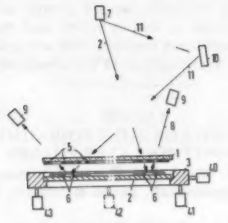
Eckart Hundt, Haar, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 10, 1978, Ser. No. 904,597

Claims priority, application Fed. Rep. of Germany, May 26, 1977, 2723902

Int. Cl.[2] G02B *27/00*

U.S. Cl. 250—492 A **6 Claims**



1. A method for the adjustment of a semiconductor disc relative to a radiation mask in x-ray photolithography where in order to determine the relative positions of semiconductor disc and radiation mask the intensity of a beam of x-rays is determined which impinges on an adjustment mark on the semiconductor disc and on an adjustment mark on the radiation mark, characterized by the fact that for one of the adjustment marks (5, 6) a reflecting adjustment mark is used which reflects at least a portion of the beam of x-rays (8; 11) impinging thereon, and sensing the intensity of the reflected beam as a measure of relative position.

4,187,432

SOURCE HOLDER FOR MOUNTING RADIOACTIVE FOIL AND HOLDER-FOIL ASSEMBLY

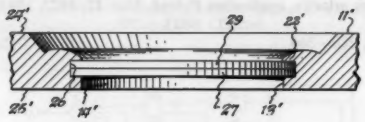
Jay R. Mileham, Tonawanda, N.Y., assignor to NRD, Division of Mark IV Industries, Inc., Grand Island, N.Y.

Filed Mar. 16, 1978, Ser. No. 887,208

Int. Cl.[2] G21G *4/00*

U.S. Cl. 250—493 **2 Claims**

1. A source holder for mounting a radioactive foil comprising a disc, an opening in said disc, a lip on said disc, a first wall on said lip defining the size of a first portion of said opening through which said foil is to radiate, a second wall on said lip oriented transversely to said first wall for providing a shelf to support said foil, a counterbore portion in said opening including a third wall extending transversely relative to said second wall on the opposite side thereof from said first wall for providing a chamber for receiving said foil, a readily deformable portion adjacent said third wall remote from said lip for permitting deformation of said third wall inwardly toward said opening to retain said foil in said counterbore, said disc including first and second opposite surfaces, and said lip being adjacent said first surface, and said fifth wall merging into said second surface.



4,187,433

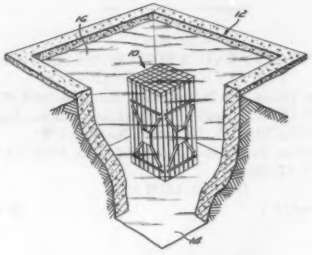
HIGH DENSITY FUEL STORAGE RACK

Louis J. Zezza, Ossining, N.Y., assignor to Automation Industries, Inc., Los Angeles, Calif.

Filed Aug. 5, 1977, Ser. No. 822,084

Int. Cl.[2] G21F *5/00*

U.S. Cl. 250—507 **13 Claims**



1. A storage rack for the high density storage of spent nuclear fuel assemblies, said storage rack comprising:

first and second grids, said first and second grids being spaced one above the other so that said first grid is positioned above said second grid, said first and second grids defining vertically aligned openings therethrough; wherein said first and second grids provide an integral support structure for said assemblies;

upright separately, supported tubular storage cells in said openings so that said fuel cells are retained in upright position and are retained spaced from each other so that when said storage rack is immersed in a storage pool spent nuclear fuel assemblies can be placed in said storage cells, most of said cells being contained in said opening from floating movement in a direction normal to said grids.

4,187,434

LONG LIFE RADIATION SHIELD FOR GAS TEMPERATURE MEASUREMENT

Frank R. Pater, Jr., Brackenridge, and Joseph M. Kapusnik, Verona, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 31, 1978, Ser. No. 938,627

Int. Cl.[2] G01K *13/00*

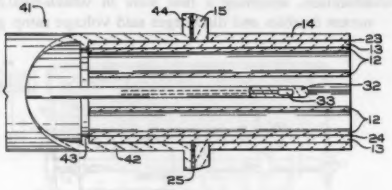
U.S. Cl. 250—515 **14 Claims**

1. A suction pyrometer radiation shield comprising

a. an elongated first alumina refractory tube

b. a series of smaller alumina refractory tubes arranged around and bonded to the inside surface of said first tube forming a central passageway

c. an outer fracture resistant alumina refractory tube surrounding said first tube



d. an alumina refractory washer closely surrounding said first tube in abutting contact with said outer alumina refractory tube.

4,187,435

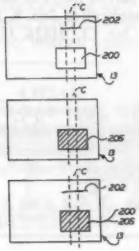
APPARATUS FOR DETERMINING IMAGE AREAS FOR PRINTING WITH CORRECTION FOR EXTRANEOUS MATTER

Roland T. Palmatier, Westerly, R.I., and Francis J. Sciulli, Palm Bay, Fla., assignors to Harris Corporation, Cleveland, Ohio

Filed Jun. 7, 1978, Ser. No. 913,520

Int. Cl.² G01N *21/30*

U.S. Cl. 250—559 **6 Claims**



1. A method for determining the relative image area in a column of an image member having image and non-image material thereon and divided into ink key columns corresponding to those in which ink is controlled in a printing cylinder comprising the steps of directing light on said image member, obtaining first data representative of the amount of light from a column of said image member having image and non-image material therein, obtaining second data indicating the amount of light received from an opaque image of the area of the image material in said column, obtaining third data indicating the amount of light received from an image including an opaque image of the area of the image material in said column and including said non-image material in said column, subtracting the second data for said column from the third data for said column to obtain a difference, and subtracting said difference from said first data for said column to remove the effect of said non-image material on said first data.

4,187,436

DEVICE FOR REGULATING THE SOURCE OF ELECTRIC ENERGY ON A HYBRID ELECTRIC VEHICLE

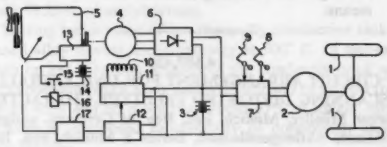
Michel Etienne, Valmondois, France, assignor to Automobiles Peugeot, Paris, France

Filed Jan. 9, 1978, Ser. No. 867,838

Claims priority, application France, Jan. 12, 1977, 76 00749

Int. Cl.² B60L *11/12*

U.S. Cl. 290—27 **7 Claims**



1. A regulating device for regulating the source of electric energy on a hybrid electric vehicle having driving wheels, comprising at least an electric motor for driving the driving wheels of the vehicle and supplied with current by said source of energy, and a generating set comprising a heat engine and a current generator which has an excitation winding and is combined with the heat engine and a first circuit connecting the generator to said source for supplying current to said source, a second circuit for determining the state of charge of said source, a device for operating and stopping the heat engine, and a third circuit associated with the excitation winding of the generator for controlling said winding as a function of the state of charge of said source, the device for operating and stopping the heat engine comprising a logic circuit controlled by said second circuit, wherein said second circuit comprises means providing a reference voltage and means for detecting a low level and means for detecting a high level of the voltage of said source relative to said reference voltage, means for memorizing an electric signal corresponding to a level of voltage of said source which is lower than said low level and means for erasing the information contained in said memory connected to an output of said means for detecting the high level of a voltage of the source of energy.

4,187,437

SWITCHING APPARATUS FOR MEDIUM-VOLTAGE CABLE NETWORKS

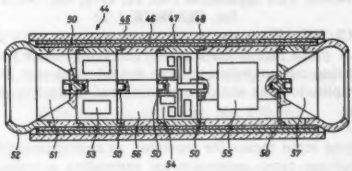
Bruno Miller, Berlin, and Werner Kohler, Bentfeld, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 29, 1977, Ser. No. 820,293

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1976, 2636410

Int. Cl.² H02G *9/02*; H02B *1/20*

U.S. Cl. 307—147 **5 Claims**



1. A single-pole switching unit adapted to be imbedded in the soil and to be used for medium voltage cable networks, said unit comprising:

a protective housing having opposed ends and adapted to be imbedded in the soil;

a switching element axially disposed in said protective housing;

actuating means for actuating said switching element, said actuating means being controlled remotely of said unit;

cable plug-in means disposed adjacent to said ends of said housing coaxially with said switching element for connecting cables of a cable network substantially coaxially with said cable plug-in means; and

coupling means disposed in said housing coaxially with said switching element and said cable plug-in means for connecting said switching element and said cable plug-in means.

4,187,438

"CIRCUIT ARRANGEMENT FOR UNILATERALLY SCANNING DISTORTED TELETYPE CHARACTERS

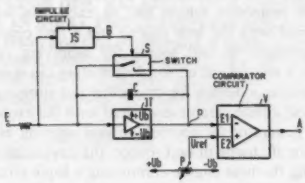
Werner Müeller, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Dec. 5, 1977, Ser. No. 857,283

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1976, 2654927

Int. Cl.[2] H03K *5/04*

U.S. Cl. 307—268 **7 Claims**



1. A circuit arrangement for unilaterally scanning distorted Teletype characters, wherein the characters are supplied to the inputs of an impulse circuit (IS) which can be controlled by step changes of a character and to an integration circuit (IT), a comparator (V) with a first input (E1) connected to the output of said integration circuit (IT) and which assumes a definite condition with each step change, a switch (S) controlled by the impulses of the impulse circuit (IS) connected in parallel with said integration circuit, a reference signal source (Uref) connected to a second input (E2) of said comparator circuit (V), and said reference signal source adjustable as a function of the desired time delay of the descending or ascending edges of the step changes.

4,187,439

ANALOG CONTROL OF PULSE RATES

Andrew M. Vesel, Mount Arlington, N.J., assignor to The Cessna Aircraft Company, Wichita, Kans.

Continuation of Ser. No. 748,341, Dec. 7, 1976, abandoned, which is a division of Ser. No. 561,466, Mar. 24, 1975, Pat. No. 4,014,025. This application Feb. 21, 1978, Ser. No. 879,522

Int. Cl.[2] H03K *1/16*

U.S. Cl. 307—271 **2 Claims**

1. A pulse rate controller for receiving input pulses and generating output pulses with an output pulse rate limited by the amplitude of an analog control signal, said controller comprising:

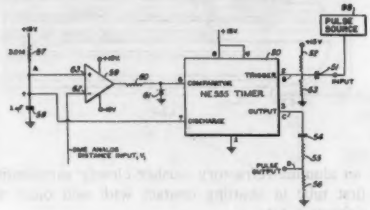
first input means for receiving input pulses;

second input means for receiving an analog control signal;

a voltage ramp generator for generating a voltage ramp signal;

a voltage comparison circuit having a first input terminal connected to said second input means and a second input terminal connected to said voltage ramp generator and assuming a first comparison condition when the analog control signal is of a greater voltage than is the voltage ramp signal and a second comparison condition when the analog control signal is of a lesser voltage than is the voltage ramp signal;

circuit means connected to said first input means, to said voltage ramp generator, and to said voltage comparison circuit; said circuit means, in response to said voltage comparison circuit assuming said second comparison condition, assuming a first state in which said circuit means disables and discharges said voltage ramp generator to prevent generation of a voltage ramp signal; said circuit means in response to an input pulse received at said first input means assuming a second state in which said circuit means enables said voltage ramp generator to generate a voltage ramp signal; and



pulse generating means connected to said circuit means for generating an output pulse in response to said circuit means assuming said second state.

4,187,440

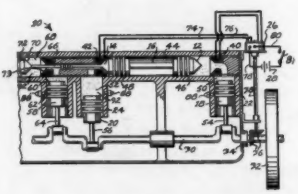
ELECTROMAGNETIC ENGINE

Jamie F. Ulmer, Rte. 5, Hwy. 70, Mount Juliet, Tenn. 37122

Continuation-in-part of Ser. No. 801,143, May 27, 1977, abandoned. This application Jun. 8, 1978, Ser. No. 913,672

Int. Cl.[2] H02K *33/12*

U.S. Cl. 310—24 **1 Claim**



1. A reciprocating device comprising, in cooperative association,

at least one pair of pistons and connecting rods mounted in respective associated cylinder chambers,

a piston and cylinder chamber located intermediate said pair of pistons and associated chambers, the intermediate chamber being connected in fluid communication with said pair of chambers,

an electrical coil located at each end of the intermediate chamber,

means for alternately applying an electrical potential to the coils of the intermediate chamber,

the alternate application of the electrical potential to the coils being effective to move the intermediate piston back and forth in the intermediate chamber, and thereby effect translation of the pair of pistons in their respective chambers.

4,187,441

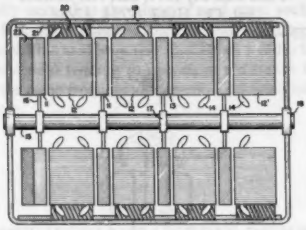
HIGH POWER DENSITY BRUSHLESS DC MOTOR

Wilford R. Oney, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 780,407, Mar. 23, 1977, abandoned. This application May 30, 1978, Ser. No. 910,677

Int. Cl.[2] H02K 7/20

U.S. Cl. 310—112 6 Claims



1. A high power density self-fed brushless dc motor comprising

a plurality of interleaved and alternating annular rotor disks and annular stator disks spaced from one another to establish an axial air gap between adjacent disks, and magnetic yoke means at either end of said interleaved rotor and stator disks for carrying peripheral flux which is provided at one end by a solid metal disk attached to an endmost rotor disk,

a housing having a shaft journalled for rotation therein, and mounting means for supporting said stator disks on said housing and for attaching said rotor disks for rotation with said shaft,

each rotor disk comprising a plurality of circularly spaced, opposite polarity cobalt-rare earth permanent magnet sectors,

each stator disk intermediate between two rotor disks comprising a laminated magnetic core made of spirally wound metal strip and having opposing sides and a set of radial and outwardly directed stator slots at both core sides in which are respectively inserted a stator winding.

4,187,442

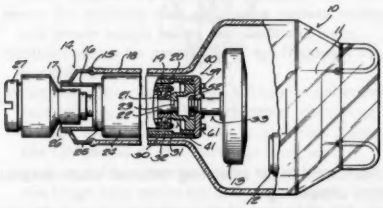
ROTATING ANODE X-RAY TUBE WITH IMPROVED THERMAL CAPACITY

Robert E. Hueschen, Hales Corners, and Richard A. Jens, Milwaukee, both of Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 5, 1978, Ser. No. 939,540

Int. Cl.[2] H01J 35/10

U.S. Cl. 313—60 7 Claims



1. In a rotating anode x-ray tube comprising an envelope, a shaft journaled in bearings for rotation within said envelope, a rotatable x-ray target disk and a coaxial stem on which said disk is mounted, an elongated cylindrical element in said envelope surrounding said shaft concentrically and subject to be rotated under the influence of a magnetic field and treated on its surface for enhancing thermal emission, a rotor hub for coupling said stem to said cylindrical element and a bearing hub for coupling said rotor hub to said shaft, the improvement for increasing the thermal capacity of said tube by restricting the flow of heat flowing from said target disk to said bearings and by increasing the flow of heat flowing to said cylindrical element wherein:

said rotor hub is made of high thermally conductive molybdenum-based alloy having a conductivity at 500° C. of at least 0.29 cal/cm^2/cm/sec/°C. and is comprised of no less than 99.25% of molybdenum,

said bearing hub is made of low thermally conductive nickel-based alloy having a conductivity at 500° C. of one-seventh or less than one-seventh of the conductivity of said molybdenum-based alloy and is comprised of no less than about 45% and no more than about 67% of nickel, and

said stem is composed substantially of columbium and is non-tubular.

4,187,443

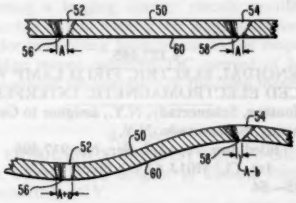
COLOR PICTURE TUBE HAVING IMPROVED CORRUGATED APERTURED MASK AND METHOD OF MAKING SAME

Ralph J. D'Amato, and Richard A. Nolan, both of Lancaster, Pa., assignors to RCA Corporation, New York, N.Y.

Filed Sep. 8, 1978, Ser. No. 940,570

Int. Cl.[2] B23P 15/16; H01J 9/14, 29/07

U.S. Cl. 313—402 6 Claims



1. In a method of constructing a corrugated mask for use in a color picture tube, wherein the mask is first apertured and thereafter formed into a corrugated shape, the improvement comprising,

in an unformed mask, forming the apertures in first locations with greater widths than the desired widths at the first locations and forming the apertures in second locations with lesser widths than the desired widths at the second locations, and

forming said mask into a corrugated shape such that the apertures in said first locations are compressed in width to the desired widths and the apertures in said second locations are stretched to the desired widths.

4,187,444

OPEN-CIRCUIT MAGNET STRUCTURE FOR CROSS-FIELD TUBES AND THE LIKE

William A. Gerard, Andover, Mass., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Jan. 19, 1978, Ser. No. 870,963

Int. Cl.[2] H01J 25/50

U.S. Cl. 315—39.71 32 Claims

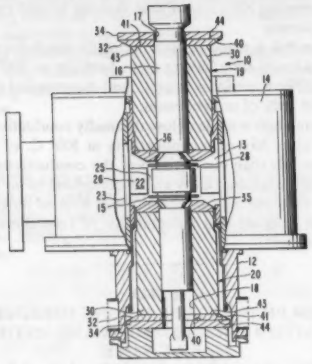
1. In an open permanent circuit defining a relatively small working gap a permanent magnet assembly comprising:

a first body comprising magnetic material including Alnico and having north and south pole faces, said body defining one boundary of said working gap with one of said pole faces;

a second body comprising magnetic material including Co-

balt in chemical union with a rare earth element and having north and south pole faces;

and a transition member comprising iron, said member being interposed between said first and second bodies in contact with opposite pole faces of said bodies such that said first



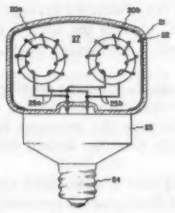
body contacts said transition member with the other of said pole faces, and said second body contacts said transition member with a pole face thereof which is polarized oppositely to said other pole face of said first body, whereby the flux density within said working gap is enhanced.

4,187,445

SOLENOIDAL ELECTRIC FIELD LAMP WITH REDUCED ELECTROMAGNETIC INTERFERENCE

John M. Houston, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 21, 1978, Ser. No. 917,498
Int. Cl.[2] H01J *65/00*; H05B *41/24*
U.S. Cl. 315—54 **16 Claims**



1. A solenoidal electric field lamp comprising:

a transparent envelope internally coated with a phosphor material which emits electromagnetic radiation at visible wavelengths upon stimulation by electromagnetic radiation;

a radio frequency electric energy source;

an ionizable fill gas disposed within said envelope; and

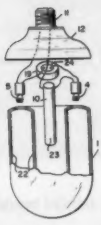
a plurality of substantially toroidal shaped magnetic cores mounted within said envelope and electromagnetically coupled to receive said radio frequency energy from said source so as to establish a varying magnetic field which establishes a solenoidal electric field which ionizes said fill gas and produces therein circulating discharge currents, said cores being so connected to said energy source and so oriented within said envelope that the magnetic dipole fields produced by said discharge currents substantially oppose each other so as to reduce the level of radio frequency electromagnetic interference radiated by said lamp.

4,187,446

SCREW-IN FLUORESCENT LAMP WITH MAGNETIC ARC SPREADING

Leo Gross, 36-11, 217 St., Bayside, N.Y. 11361, and Merrill S. Skeist, 7 Fairchild, Plainview, N.Y. 11803

Filed Sep. 21, 1977, Ser. No. 834,651
Int. Cl.[2] H01J *17/14, 17/34*
U.S. Cl. 315—58 **4 Claims**



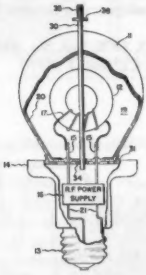
1. A fluorescent lamp comprising an outer envelope having a hollow center, partitions defining at least one chamber in said envelope, said partitions constraining the arc discharge to follow a zigzag path around the envelope, said chamber containing two electrodes to form the arc discharge, and a luminescent phosphor coating all interior walls of said chamber and envelope, ballast and circuitry means in said hollow center, and a screw-in base secured to said envelope and electrically operatively connected to said ballast and circuitry means and said filaments.

4,187,447

ELECTRODELESS FLUORESCENT LAMP WITH REDUCED SPURIOUS ELECTROMAGNETIC RADIATION

Virgil L. Stout, and John M. Anderson, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 11, 1978, Ser. No. 941,126
Int. Cl.[2] H01J *1/52*
U.S. Cl. 315—85 **9 Claims**



1. A fluorescent lamp exhibiting reduced electromagnetic interference comprising:

an evacuable, light-transmissive envelope of generally globular configuration;

a toroidally-shaped magnetic core;

means coupled to said core for establishing a radio frequency magnetic field about said core;

a gaseous medium within said envelope adapted to sustain an

electrical discharge when subjected to said radio frequency magnetic field established about said core and to emit radiation at a first wavelength when sustaining said discharge;

a phosphor coating disposed on the interior surface of said envelope and adapted to emit visible light when excited by radiation of said first wavelength; and

a continuous, conductive loop situated about said envelope and said core, the plane of said loop being oriented substantially normal to the plane of said core, such that the radio frequency magnetic field about said core induces current within said loop that establishes a radio frequency magnetic field tending to cancel, at a distance from said lamp, the radio frequency magnetic field established about said core.

4,187,448

DISCHARGE LAMP LIGHTING DEVICE

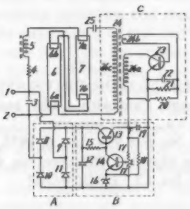
Hisashi Kuroi; Masayoshi Miyajima, both of Kyoto, and Takao Matoba, Wakayama, all of Japan, assignors to Kuroi Kosan Co., Ltd., Kyoto, Japan

Filed Dec. 7, 1977, Ser. No. 858,473

Claims priority, application Japan, Dec. 13, 1976, 51-150133; Dec. 13, 1976, 51-150134; Dec. 13, 1976, 51-150135

Int. Cl.[2] H05B *37/00, 39/00, 41/00*

U.S. Cl. 315—176 **7 Claims**



1. A circuit for turning ON a discharge lamp means and maintaining said discharge lamp means ON for an ON period of a selected duration, said discharge lamp means having a characteristic negative impedance, the improvement comprising:

first impedance means in a series loop with said discharge lamp for effectively canceling said negative impedance of said discharge lamp in said series loop when said discharge lamp is ON;

power supply means for generating a low frequency alternating current voltage commensurate with commercial power amplitude and frequency values;

means for applying said alternating current voltage from said power supply across said discharge lamp;

oscillator means for generating a high frequency alternating current voltage;

means for superposing said high frequency alternating current voltage on said low frequency alternating current voltage across said discharge lamp means during the entire ON period of said discharge lamp; and

second impedance means in said series loop between said discharge lamp means and said power supply for blocking high frequency voltages but passing the low frequency alternating current voltage of said power supply to said discharge lamp means;

whereby said discharge lamp means is maintained ON by the superposed alternating current voltages of said power supply means and said oscillator means.

4,187,449

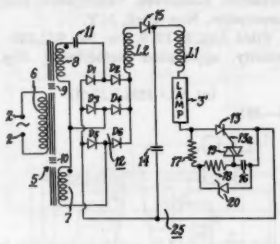
DISCHARGE LAMP OPERATING CIRCUIT

David W. Knoble, East Flat Rock, N.C., assignor to General Electric Company, Schenectady, N.Y.

Filed May 8, 1978, Ser. No. 904,059

Int. Cl.[2] H05B *41/16*

U.S. Cl. 315—205 **15 Claims**



1. A lamp operating circuit comprising, in combination, an AC source, a ballast transformer comprising a primary winding connected to said AC source, first and second secondary windings arranged on opposite sides of said primary winding magnetically coupled thereto, and magnetic shunts separating said primary winding from the respective secondary windings, a capacitor connected to one of said secondary windings forming therewith a leading current circuit, the other secondary winding in combination with the magnetic shunt adjacent thereto forming a lagging current circuit, rectifier bridge means connected to said leading and lagging current circuits, and means for connecting lamp means to the output of said rectifier bridge means, whereby DC current of low ripple content is produced for operation of the lamp means.

4,187,450

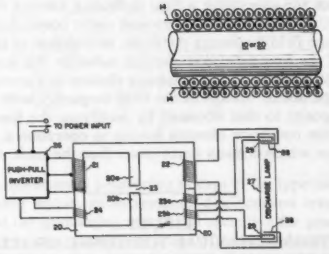
HIGH FREQUENCY BALLAST TRANSFORMER

DeYu Chen, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 9, 1978, Ser. No. 884,767

Int. Cl.[2] H05B *41/26*

U.S. Cl. 315—278 **9 Claims**



1. A high frequency ballasting transformer providing integral ballasting and permitting non-bifilar windings comprising:

a closed loop magnetic core of low relucatance material;

a first, single layer primary winding portion having a plurality of turns and being disposed about a first portion of said closed loop core;

a second, single layer primary winding portion having a plurality of turns and being disposed about said first primary winding and being serially connected therewith;

a secondary winding having a plurality of turns and being disposed about a second portion of said closed loop core; and

a magnetic shunt with air gap therein bypassing said closed loop magnetic core, said shunt furnishing reactance in parllel with said secondary winding.

4,187,451

COLOR PICTURE DISPLAY DEVICE WITH A CIRCUIT FOR GENERATING A SCREEN GRID VOLTAGE

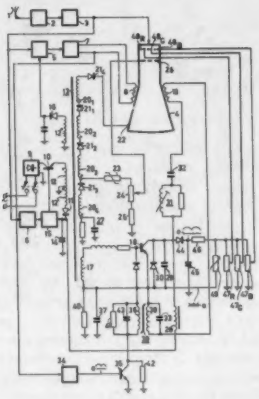
Antonius Boekhorst, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 8, 1978, Ser. No. 932,288

Claims priority, application Netherlands, Sep. 12, 1977, 7709969

Int. Cl.[2] H01J *29/52*

U.S. Cl. 315—381 **7 Claims**



1. A color picture display device comprising a color picture display tube having at least a final anode and a screen grid electrode, a high tension generator for generating a high tension for the final anode and a line deflection generator for generating a line deflection current through a line deflection coil, and comprising a rectifier for rectifying line flyback pulses for generating a supply voltage for the screen gride electrode, said generators being separated from one another, said display device furthermore comprising a field deflection generator for generating a field deflection current through a field deflection coil and an east-west raster correction generator for the field-frequency parabolic modulation of the amplitude of the line deflection current, wherein the screen grid electrode is coupled via a resistance element to a source generating a parabolic voltage of the field frequency with a curvature opposite to that obtained by rectifying the line flyback pulses, the resistance element having in operation a dynamic resistance which is many times lower than the static resistance thereof.

4,187,452

ELECTROMECHANICAL TORSIONAL OSCILLATOR WITH RESONANT FREQUENCY AND AMPLITUDE CONTROL

LaVerne F. Knappe; Roger H. Peterson, and Gary J. Stroebel, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 27, 1975, Ser. No. 608,120

Int. Cl.[2] H02K *41/00*

U.S. Cl. 318—128 **8 Claims**

1. An electromagnetic actuator comprising:

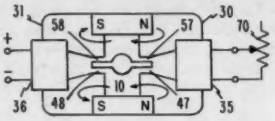
first and second "C" shaped core members of soft magnetic material each having a pair of opposing pole faces defining an air gap,

first and second permanent magnet means connecting said "C" shaped core members to create similar magnetic poles at the opposing pole faces of said "C" shaped core members,

an armature of soft magnetic material,

torsion bar means for supporting said armature for movement about the center of mass of said armature with the ends of said armature positioned largely within the air gaps of said "C" shaped core members,

a drive winding on said first "C" shaped core member, adapted to be energized with an alternating current drive



signal to create a differential flux density between said armature and opposing pole faces of said first "C" shaped core member causing said armature to move initially in the direction of the pole face having the air gap with the higher flux density and thereafter, to oscillate at the frequency of said alternating current drive signal, and

variable impedance means connected in series with said drive winding for selectively adjusting the Q of said actuator.

4,187,453

ELECTRIC MOTOR DRIVE SYSTEM

J. Kirkwood H. Rough, Palo Alto, Calif., assignor to Jim Zegeer, Alexandria, Va., a part interest

Continuation of Ser. No. 538,979, Jan. 6, 1975, abandoned. This application May 11, 1976, Ser. No. 685,482

Int. Cl.[2] H02K *41/02*

U.S. Cl. 318—135 **23 Claims**

1. An electric stepping motor comprising,

a thin, light, non-metallic, non-magnetic carrier member, and means mounting said carrier member for movement in a selected direction of drive,

a plurality of first conductor members, each of said first conductor members being formed on a surface of said thin carrier member and traversing a path transverse to said selected direction of drive, said first conductor members being spaced a selected distance apart and constituting a first array of active run portions, and first connector means connecting the ends of said active run portions to form a first serpentine winding,

at least a plurality of second conductor members on a surface of said thin carrier member, each traversing a companion path transverse to said direction of drive and displaced a selected distance with respect to said first plurality of conductors and constituting a second array of active run portions and second connector means connecting the ends of said second plurality of conductor members to form a second serpentine winding separate from said first serpentine winding,

means establishing a series of incremental polarized magnetic fields arranged along said direction of drive to form magnetic drive detents between the said magnetic fields and said active conductor members upon energization of said conductor members, and

means connected to the first of said serpentine windings for supplying a first operating current thereto and means connected to the second of said serpentine windings for separately supplying a second operating current thereto.

4,187,454
INDUSTRIAL ROBOT

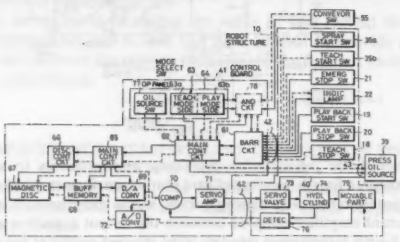
Yoshimasa Ito, Yokohama, and Junichi Ikeda, Tokyo, both of Japan, assignors to Tokico Ltd., Kawasaki, Japan

Filed May 1, 1978, Ser. No. 901,841

Claims priority, application Japan, Apr. 30, 1977, 52-50105; Sep. 20, 1977, 52-112996; Sep. 20, 1977, 52-112997

Int. Cl.[2] G05B *19/42*

U.S. Cl. 318—568 **4 Claims**



1. An industrial robot comprising: a robot structure having a movable part; driving means for driving said movable part; detection means for detecting a substantial displacement of said movable part and for generating a position detection signal; memory means for memorizing the signal from said detection means and reading out the signal thus memorized, said memory means being capable of a plurality of operation programs corresponding to kinds of workpieces: control means adapted to control a memorizing operation and read out operation of said memory means and control of said driving means responsive to the signal read out from the memory means; program number selection means for selecting a pre-determined program connected to the control means, whereby a program corresponding to the program number thus selected by said program number selection means is read out from said memory means; workpiece conveying means for conveying a workpiece through a space in which said movable part of said robot structure moves, allowing working to said workpiece at a predetermined working place; and workpiece detection means disposed near entrance to the working place in a conveying path of said conveying means, for detecting the workpiece conveyed to the working place and to thereby send out a detection signal to said control means, said control means undergoing operation in response to the work detection signal supplied thereto.

4,187,455
STEPPER MOTOR FEEDBACK IN POSITION SERVO LOOP

Anthony N. Martin, Simsbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 4, 1975, Ser. No. 601,816

Int. Cl.[2] G05B *11/18*

U.S. Cl. 318—594 **2 Claims**

1. A stepping motor position servo loop comprising:

a rotary mechanical device;

a stepper motor having a plurality of separately-energizable windings and a rotor mechanically connected to said mechanical device for rotating said device to a position determined by the particular windings which are energized by signals applied thereto;

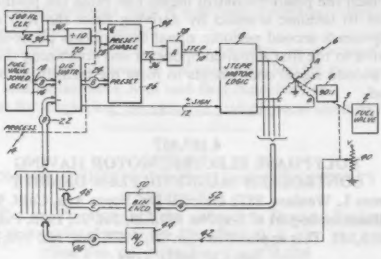
first means connected to said mechanical device for generating a first digital word indicative of the position of said mechanical device comprising a plurality of high order data bits and a number of low order data bits;

second means separately connected to each of the windings of said stepper motor and responsive to the particular windings being energized for generating a second digital word having said number of bits and representative of the position of said stepper motor;

third means for presenting a digital word indicative of a position command for said mechanical device;

means responsive to said first, second and third means for subtracting a digital word, consisting of said second digital word and said plurality of high order bits of said first digital word, from said position command digital word for generating a position error manifestation; and

means responsive to said position error manifestation for applying signals to particular windings of said stepper motor for controlling the position thereof and over corresponding connections to said second means.



4,187,456
INCREMENTAL POSITIONING SYSTEM

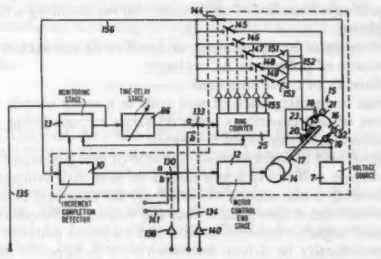
Johann von der Heide, Mönchweiler, Fed. Rep. of Germany, assignor to Papst-Motoren KG, St. Georgen/Schwarzwald, Fed. Rep. of Germany

Filed Oct. 19, 1977, Ser. No. 843,784

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1976, 2647956

Int. Cl.[2] G05B *5/01*

U.S. Cl. 318—616 **6 Claims**



1. In an incremental positioning system of the type including a positioning motor, an incremental-displacement transducer coupled to the positioning motor and operative for generating a transducer output signal comprised of periodic signal components indicating successive increments of displacement of the positioning motor, position-control means receiving the transducer output signal and operative for causing the positioning motor to become arrested upon completion of any of the positioning-motor displacement increments indicated by any of the periodic signal components of the transducer output signal by applying to the positioning motor an actuating signal derived from the transducer output signal and dependent upon a component proportional to the transducer output signal and a component proportional to the time-derivative of the transducer output signal, a novel incremental-displacement transducer, the novel incremental-displacement transducer comprising a plurality of light detectors; a synchronizing structure

coupled to the positioning motor for movement therewith and moving through the light paths of the light detectors causing the light detectors to each generate a respective one of a plurality of mutually phase-shifted first periodic signal components; and signal-processing means operative for increasing the number of periodic signal components in the transducer output signal and thereby increasing the number of definite positions at which the position-control means can cause the positioning motor to become arrested by deriving from the first signal components second periodic signal components phase-shifted relative to the first signal components and combining the first and second signal components to form the transducer output signal.

4,187,457

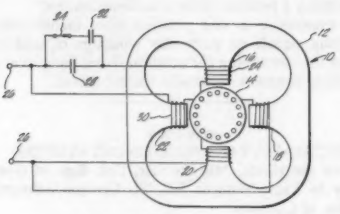
POLYPHASE ELECTRIC MOTOR HAVING CONTROLLED MAGNETIC FLUX DENSITY

Cravens L. Wanlass, 9871 Overhill Dr., Santa Ana, Calif. 92705

Continuation-in-part of Ser. No. 597,529, Jul. 21, 1975, Pat. No. 4,063,135. This application Apr. 25, 1977, Ser. No. 790,758

Int. Cl.[2] H02F *1/44*

U.S. Cl. 318—729 **52 Claims**



1. A polyphase electric motor comprising:

a stator including a core of magnetic material;

a rotor;

a main polyphase stator winding wound on said core and encompassing said magnetic material, said winding comprising a plurality of coils, each coil representing a single phase;

a plurality of input terminals adapted to be connected to a source of polyphase AC voltage;

a plurality of capacitors; and

means connecting each of said coils in a series circuit with one of said capacitors and said series circuits being connected with said input terminals;

each of said capacitors being capable of being charged to a voltage sufficient, when added to said AC voltage, to develop a volt-second value across the magnetic material of said stator core greater than the volt-second capacity of said magnetic material so that said magnetic material will periodically be driven into saturation in opposite directions upon changes in polarity of the phases of said polyphase AC voltage.

4,187,458

CONSTANT POWER REGENERATIVE MAGNETIC SWITCHING REGULATOR

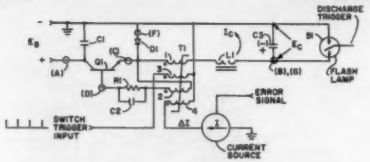
Walter E. Milberger, Severna Park, Md., and Larry G. Wright, Salisbury, N.C., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 7, 1978, Ser. No. 931,356

Int. Cl.[2] H02M *3/335*; G05F *1/56*

U.S. Cl. 323—17 **5 Claims**

1. A constant power regenerative magnetic switching regulator comprising: a transistor, a diode, a transformer having a plurality of windings, a choke, and a load capacitance, said transistor being adapted to receive a collector input voltage signal and being emitter output coupled in series through a first winding of said transformer and said choke to said output capacitance, a circuit common being coupled to said output capacitance to provide a complete charging path therethrough, said diode being coupled between said transistor emitter output and said circuit common, and said transformer being adapted for receiving a switching trigger input signal across a second of said plural windings, said transistor base is coupled through a third of said transformer windings to said



emitter diode junction for providing biasing levels to said transistor, a fourth winding of said plural transformer windings is adapted to receive a biasing current signal therethrough, and a current amplifier coupled between the output capacitor and said fourth transformer winding, said current amplifier having a reference signal input for comparing with the signal developed across said output capacitor to provide a variable control signal output to said fourth transformer winding.

4,187,459

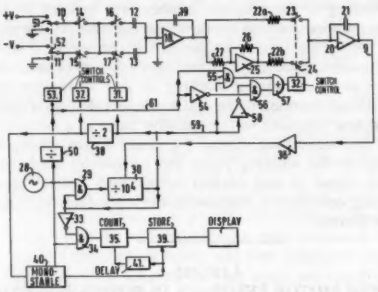
DIGITAL MEASUREMENT OF IMPEDANCE RATIOS

Peter C. F. Wolfendale, Milton Keynes, England, assignor to Automatic Systems Laboratories Limited, Bedfordshire, England

Filed Feb. 13, 1978, Ser. No. 877,542

Int. Cl.[2] G01R *27/26*

U.S. Cl. 324—60 C **6 Claims**



1. A circuit arrangement for measuring the ratio of the values of first and second electrical capacitances, and arrangement comprising:

(a) means for switching a supply voltage to provide an alternating supply voltage to each of said first and second capacitances,

(b) synchronous demodulator means,

(c) amplifying means coupling said capacitances to said synchronous demodulator means,

(d) said synchronous demodulator means being connected to demodulate the alternating supply signal transmitted from said capacitors,

(e) integrator means connected to receive the demodulated signal to provide an integral signal representative of the time-integral thereof,

(f) control means providing a control signal to control said switch means, said control signal having first and second values whereby to provide a cycle of operation having two stages, namely a first stage wherein said alternating

supply voltage is applied to said first capacitance for a first predetermined interval of time and the value of said integral signal increases from a threshold value to a value dependent on the value of said first capacitance during said first time interval and a second stage in which said alternating supply voltage is applied to said second capacitance and the value of said integral signal returns to said threshold value in a second interval of time, the value of said second interval being dependent on the value of said second capacitance, and

(g) means for determining the value of said second time interval relative to said first time interval to provide an indication of the ratio on the values of the first and second capacitances.

4,187,460

CAPACITANCE MEASURING BY COMPARISON TO REFERENCE CAPACITANCE

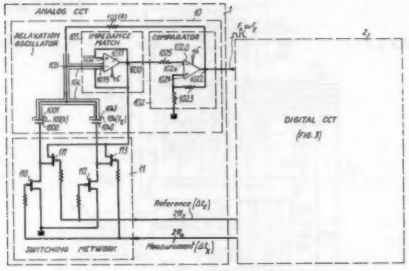
Gilbert V. Dauge, Lagny, and Jacques F. Langlais, Coudray Montceaux, both of France, assignors to Testut Aequitas, Paris, France

Filed Sep. 25, 1978, Ser. No. 945,413

Claims priority, application France, Sep. 23, 1978, 77 28758; Sep. 13, 1978, 78 26295

Int. Cl.² G01R 27/26

U.S. Cl. 324—60 CD **10 Claims**



1. A capacitance measuring device for measuring the capacitance X of a first capacitor by means of the comparison of the charge and discharge periods of a second capacitor having a calibrated reference capacitance X_E with said first capacitor during two successive reference and measuring phases of a comparison cycle, said device comprising:

an oscillating circuit including one of said first and second capacitors and having an oscillation period proportional to the capacitance of said included capacitor and a high stability,

switching means for connecting at the beginning of each of said reference and measuring phases said second and first capacitors in said oscillating circuit respectively,

means for counting a predetermined number N_E of pulses delivered from said oscillating circuit during said reference phase so as to define a determined duration of said reference phase and for counting a number N_X of pulses delivered from said oscillating circuit during said measuring phase, the ratio of said oscillation pulse numbers N_E and N_X being inversely proportional to the ratio of said capacitances X_E, X of said second and first capacitors,

timing means for generating pulses having at least a clock frequency,

means for counting and down-counting said clock pulses during said reference and measuring phases respectively,

means controlled by said counting means for changing the counting condition to the down-counting condition of said counting and down-counting means when the count of said counting means is equal to said predetermined number N_E at the end of said reference phase,

means controlled by said counting and down-counting means for stopping the counting of said counting means when the count of said counting and down-counting means is equal to zero at the end of said measuring phase so that the duration of said measuring phase is equal to or in a predetermined ratio R with said determined duration of said reference phase,

means for computing a physical quantity proportional or inversely proportional to the value $(N_E X_E)/(R N_X)$ equal to said capacitance X of said first capacitor, and

means for displaying the value of said physical quantity.

4,187,461

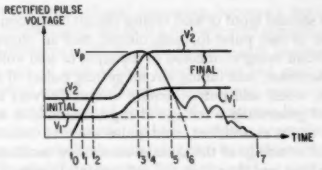
DYNAMIC THRESHOLD IMPULSE DIRECTIVITY INDICATOR

Philip P. Cox, Piscataway, N.J., assignor to Dranetz Engineering Laboratories, Inc., South Plainfield, N.J.

Filed Feb. 21, 1978, Ser. No. 879,234

Int. Cl.² G01R 19/00, 31/08

U.S. Cl. 324—102 **11 Claims**



8. In a circuit for indicating the direction of origin of a transient disturbance the combination comprising:

means for preliminarily storing indications of the polarities of the transient current and voltage accompanying said disturbance while the magnitude of said disturbance is rising through a first threshhold; and

means thereafter controlled while said magnitude of said disturbance is passing through a second threshhold higher than said first threshhold for displaying said stored indication.

4,187,462

ELECTRONIC SYSTEM FOR DETERMINING BLOOD SEDIMENTATION RATE USING A CONTINUALLY RETUNED RESONANT CIRCUIT

Rolf Haker, Frankenthal; Klaus Schrader, Heidelberg, and Joachim Thiery, Mannheim, all of Fed. Rep. of Germany, assignors to Labora Mannheim GmbH fur Labortechnik, Mannheim, Fed. Rep. of Germany

Filed Jan. 20, 1978, Ser. No. 870,939

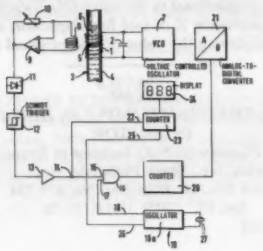
Claims priority, application Fed. Rep. of Germany, Jan. 22, 1977, 2702557

Int. Cl.² G01R 33/12

U.S. Cl. 324—204 **8 Claims**

1. Electronic system for determining the blood sedimentation rate of erythrocytes in plasma in a substantially vertical test tube, where the electrical or magnetic property of a given volume of liquid in the test tube, changed by the sedimentation of the erythrocytes, is measured as a function of time, comprising a voltage-controlled oscillator with an output circuit which is coupled with the volume of liquid to be measured for change in property with time, in which output circuit a tuned L-C circuit, connected to the voltage-controlled oscillator, is inductively coupled with its coil to the volume of liquid to be measured at a defined height of the test tube; another coil inductively coupled to said coil of the tuned L-C circuit; and delivering high voltage if said L-C circuit is at resonance, and low voltage if said L-C circuit is out of resonance; a retuning

circuit formed of a pulse-forming circuit and a tuning circuit connected in series, said pulse-forming circuit being connected to said other coil and delivering an output pulse of a defined logic state when said L-C circuit is out of resonance; a pulse counter connected to said pulse-forming circuit for receiving and counting said output pulses of said pulse-forming circuit, a quartz-stabilized oscillator connected to said pulse counter for delivering a quartz time base for the counting process in said counter and a pulse sequence to a first input of the tuning



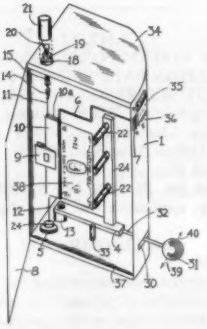
circuit, a second input of said tuning circuit being connected to an output of said pulse-forming circuit, and an output of said tuning circuit being connected to the input of said voltage-controlled oscillator, said tuning circuit getting pulses of said pulse sequence, when said pulse-forming circuit delivers an output pulse, and generating a voltage change, which lasts until resonance is again established, said pulse counter indicating the number of retunings of the voltage controlled oscillator within said time base and therefore the sedimentation rate of erythrocytes.

4,187,463

COUNTERFEIT DETECTOR FOR PAPER CURRENCY

Gilbert Kivenson, 22030 Wyandotte St., Canoga Park, Calif. 91303

Filed Apr. 20, 1978, Ser. No. 898,376
Int. Cl.[2] G07O 7/00
U.S. Cl. 324—228 **1 Claim**



1. In a counterfeit detector for United States paper currency which makes use of the magnetic properties of the imprinted ink as its operating principle, an assembly comprised of the following:

a. a pinch clamp for firmly grasping a sample of paper currency, said clamp being mounted between flexible suspension elements which are in turn supported at their extremities and maintained in tension, said flexible suspension elements permitting elastically restrained motion of the pinch clamp and its grasped sample of paper currency;

b. an indicating means mounted on said clamp for the measurement of clamp motion;

c. a moveably mounted magnet which can be brought into contact with said currency sample and then drawn away, inducing initial adherence between genuine currency and said magnet, and then, a separation with increased magnet movement because of increased counter torque of said flexible suspension elements;

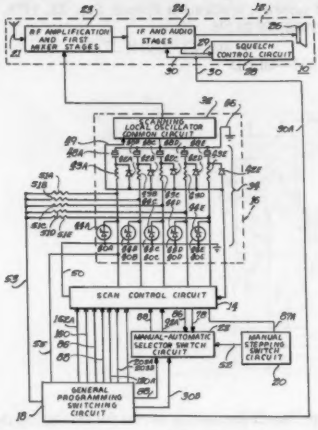
d. a scale fixedly mounted with reference to said indicating means and calibrated to facilitate the reading of the separation point, said point being within a limited range of clamp motion if the currency being tested is not counterfeit.

4,187,464

SCANNING RECEIVER

Joseph T. Yiu; Jeffrey G. Lea, both of Lincoln, and Roy L. Holmes, Lexington, all of Nebr., assignors to Hy-Gain de Puerto Rico, Inc., Lincoln, Nebr.

Filed Jul. 14, 1977, Ser. No. 815,577
Int. Cl.[2] H04B 1/32
U.S. Cl. 325—470 **17 Claims**


RF AMPLIFICATION AND FIRST MIXER STAGES
IF AND AUDIO STAGES
SQUELCH CONTROL CIRCUIT
SCANNING LOCAL OSCILLATOR COMMON CIRCUIT
SCAN CONTROL CIRCUIT
MANUAL-AUTOMATIC SELECTOR SWITCH CIRCUIT
MANUAL STEPPING SWITCH CIRCUIT
GENERAL PROGRAMMING SWITCHING CIRCUIT

1. Radio apparatus comprising:

radio frequency means for receiving radio frequency energy;

signal processing means for selecting certain wavelengths of said radio frequency energy and for producing audio intelligence from said wave lengths of radio frequency energy;

said signal processing means including mixer means for converting radio frequency energy to lower frequency energy;

control means for selecting the frequency of radio frequency energy that is to be converted to lower frequency energy;

said control means including oscillator means for repeatedly generating a series of selected frequencies from a plurality of different frequency local oscillations for transmission to said mixer means, whereby a plurality of frequencies are repeatedly scanned and signal means for generating a series of control signals differentiating between each of said different frequency local oscillations to be transmitted to said mixer means and certain other of said plurality of frequencies in each scan;

programming means for generating programming signals representing at least one programmed frequency in said series of frequencies of a scan;

said signal means including control-signal means for changing said control signals in response to said programming signals whereby different frequencies of said plurality of

different frequencies in a scan are applied to said mixer means; and

said control signal means including memory means for recording said programming signals and read means for reading said programming signals from said memory means at least as soon as said control signal generating means generates a control signal representing said programmed frequency in said scan.

4,187,465

DEVICE FOR PROTECTION AGAINST TRANSMISSION ERRORS IN AN INFORMATION TRANSMISSION SYSTEM

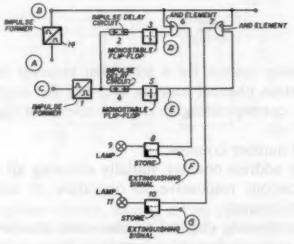
Kurt Garbrecht, Neuried, and Bernhard Hildebrandt, Hochbrück, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Apr. 14, 1977, Ser. No. 787,600

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1976, 2618148

Int. Cl.² H04B *1/00*

U.S. Cl. 325—31 **2 Claims**



1. A system for protection against the presence of transmission errors in an information transmission system in railroad systems having an interrogation apparatus means for emitting a periodically variable frequency interrogation signal within a specified frequency band formed of successive frequency ranges, each frequency range being formed of a plurality of sub-ranges, and a reply apparatus means for dampening the interrogation signal in at least one sub-range in accordance with information to be transmitted, said reply apparatus means frequency-selectively reflecting the interrogation signal to the interrogation apparatus means and providing a characteristic power penetration in the at least one sub-range, said system comprising: a first means for producing a first impulse sequence whose impulses lie centrally at a border of all of said sub-ranges, a first comparator means, and an interference signal device means for providing an interference signal if said comparator means determines that a center of the power penetration lies within one of the impulses at the border of the respective sub-range, a second means for producing a second impulse sequence whose impulses lie centrally at the border of all of said sub-ranges and which are wider than the impulses of the first impulse sequence, a second comparator means, and an alert signal device means for providing an alert signal if said second comparator means determines that the center of the power penetration lies within one of the impulses of the second impulse sequence at the border of the respective sub-range.

4,187,466

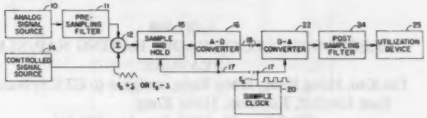
SIGNAL INJECTION TECHNIQUE

James M. Kasson, San Mateo, and Martin H. Graham, Berkeley, both of Calif., assignors to Rolm Corporation, Santa Clara, Calif.

Filed Jan. 16, 1978, Ser. No. 869,745

Int. Cl.² H04B *1/00*

U.S. Cl. 325—42 **22 Claims**



1. A method for reducing noise in a digital information transmission system, said method comprising the steps of:

a. generating an analog input signal having a spectral content lying within a predetermined operating frequency band;

b. generating a periodic controlled signal having a spectral content substantially devoid of frequency components within the limits of said operating frequency band;

c. providing a digital signal at a pre-selected sampling rate to a transmission medium, said digital signal representing a composite of said analog input signal and said periodic controlled signal, said analog input signal being quantized with a predetermined number of quantizing levels of predetermined magnitude, and said periodic controlled signal having an amplitude satisfying the conditions of the uniform probability density functions and a peak-to-peak amplitude of not less than one quantization level;

d. converting said digital signal to analog form at a receiving end of said transmission medium; and

e. filtering said converted analog signal to remove substantially all frequency components lying outside of said predetermined operating frequency band.

4,187,467

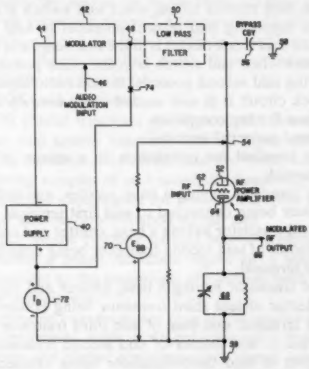
GROUNDED RF POWER AMPLIFIER CIRCUIT APPARATUS

Forest M. Cummings, Richardson, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 24, 1978, Ser. No. 881,098

Int. Cl.² H04B *17/00*

U.S. Cl. 325—133 **11 Claims**



1. The method of reducing hazardous voltage potentials on anode voltage meters used in the final stage of an RF power amplifier of a radio transmitter comprising, the steps of:

connecting an anode of a RF power amplifier tube to DC ground potential;

connecting a series circuit cathode modulator between the cathode of said RF tube and a high negative voltage power terminal with respect to said DC ground potential; and

connecting an anode voltage meter in parallel with RF power amplifier tube for measuring anode-to-cathode voltage.

4,187,468

ELECTRONIC CLOCK RADIO HAVING NAP/SLEEP FEATURE

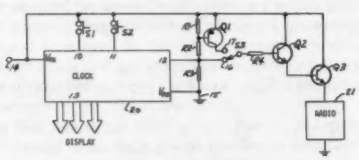
Lin Kao, Hong Kong, Hong Kong, assignor to GTE Sylvania Far East Limited, Kowloon, Hong Kong

Filed Apr. 25, 1977, Ser. No. 790,441

Claims priority, application United Kingdom, Jun. 29, 1976, 27122/76

Int. Cl.[2] H04B *1/06*; G04C *21/16*

U.S. Cl. 325—396 **1 Claim**



1. Apparatus comprising:

a clock integrated circuit having a clock input connection to which a first energizing potential may be applied and an output connection, said circuit also having first and second mutually exclusive electric states, said circuit normally being in said first state and being placed in said second state for a selected interval of time after said first potential is applied to said clock input connection, said circuit including means for selecting the duration of said interval for time intervals not greater than 60 minutes;

a radio having a radio input connection and normally being in an OFF state, said radio being placed in an ON state upon receiving a second energizing potential applied to said radio input connection;

NAP/SLEEP switch means connected to said clock circuit input connection for supplying said first energizing potential to said clock; and

control means including a two position manually operable switch and being connected to said radio input connection, said control means when said switch is in one position supplying said second potential to said radio input when said clock circuit is in the first state, and said control means when said switch is in the other position also supplying said second potential to said radio input when said clock circuit is in said second state, wherein said control means further comprises:

a ground potential terminal;

a first terminal for connection to a source of energizing potential;

a first transistor having a base, emitter, and collector, said emitter being connected to said first terminal;

a second transistor having a base, emitter and collector, said collector of said second transistor being connected to said first terminal;

a third transistor having a base, emitter and collector, said collector of said third transistor being connected to said first terminal, said base of said third transistor being connected to said emitter of said second transistor, and said emitter of said third transistor being connected to said radio input;

said manually operable switch having a common terminal and first and second switch terminals, said first switch terminal being connected to said clock output and said second switch terminal being connected to said collector of said first transistor;

a first resistor connected between said first terminal and said base of said first transistor;

a second resistor connected between said base of said first transistor and said clock output;

a third resistor connected between said clock output and said ground potential; and

a fourth resistor connected between the common terminal of said switch and said base of said second transistor.

4,187,469

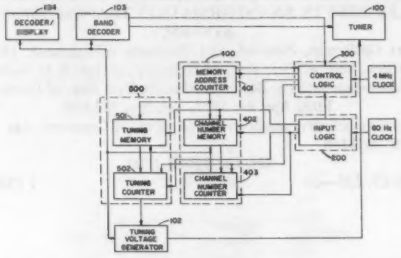
LIMITED CHANNEL TELEVISION RECEIVER WITH ORGANIZED MEMORY

Akio Tanaka, Chicago, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Oct. 7, 1977, Ser. No. 840,340

Int. Cl.[2] H04B *1/16*

U.S. Cl. 325—464 **15 Claims**



10. A tuning system for a television receiver including a limited location channel number memory for storing tuning information corresponding to desired television signals comprising:

a channel number counter;

a memory address counter, initially scanning all said memory locations responsive to operation of said channel number counter;

means for entering channel numbers and channel number-related tuning information in said memory locations;

a tuning voltage generator;

means for reading out said information for controlling said tuning voltage generator; and

sequence means for controlling said memory address counter such that said memory locations are subsequently read out in channel number irrespective of the order of entry of said tuning information.

4,187,470

DIELECTRIC-LOADED WAVEGUIDE CIRCULATOR FOR CRYOGENICALLY COOLED AND CASCADED MASER WAVEGUIDE STRUCTURES

Robert A. Frosch, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Robert C. Clauss, La Crescenta, and Rex B. Quinn, La Canada, both of Calif.

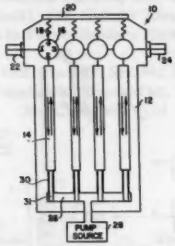
Filed Feb. 9, 1978, Ser. No. 876,432

Int. Cl.[2] H01S *1/00*

U.S. Cl. 330—4 **10 Claims**

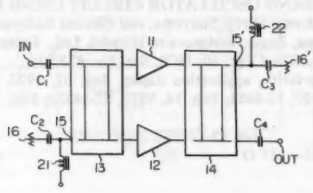
1. A dielectrically loaded four-port waveguide circulator for use with a reflected-wave maser connected to a second port opposite a fourth port between first and third ports thereof to form one of a plurality of cascaded maser waveguide structures, wherein said fourth port is connected to a waveguide loaded with microwave energy absorbing material, said third port of one maser waveguide structure is connected by a waveguide loaded with dielectric material to the first port of an

adjacent maser waveguide structure, and the second port is connected to a reflected-wave maser by coupling means which



passes the signal energy to be amplified into and out of the reflected-wave maser and blocks pumping energy in the reflected-wave maser from entering the circulator.

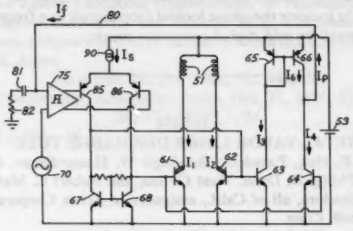
4,187,471
BIAS CIRCUIT
Yutaka Shimoji, Ebina, and Youichi Arai, Machida, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan
Filed Aug. 21, 1978, Ser. No. 935,646
Claims priority, application Japan, Sep. 2, 1977, 52-104722
Int. Cl.[2] H03F *3/189, 3/68*
U.S. Cl. 330—277 **16 Claims**



1. An amplifier circuit, having a bias circuit, comprising a pair of amplifier modules each of said pair of amplifier modules having an input and an output and at least one directional quadrature coupler operatively connected to said pair of amplifier modules, said at least one directional quadrature coupler having four ports including an isolation port, wherein said bias circuit is directly connected to said isolation port of said at least one directional quadrature coupler and wherein a dc bias current is supplied from said isolation port to said pair of amplifier modules through said at least one directional quadrature coupler.

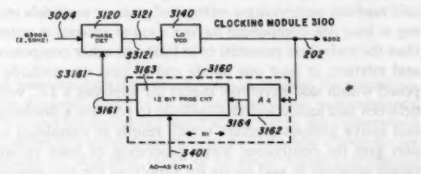
4,187,472
AMPLIFIER EMPLOYING MATCHED TRANSISTORS TO PROVIDE LINEAR CURRENT FEEDBACK
Dooho Yum, Elk Grove Village, Ill., assignor to Beltone Electronics Corporation, Chicago, Ill.
Filed Jan. 30, 1978, Ser. No. 873,217
Int. Cl.[2] H03F *1/34*
U.S. Cl. 330—260 **6 Claims**

1. A solid-state linear amplifier comprising, in combination,
a high-gain amplifier having an input and an output,
a source of signals connected to supply an input signal current to the input of said amplifier,
a load circuit,
at least one bipolar junction output transistor having its collector connected to said load circuit,
a bipolar junction feedback transistor, said feedback and said output transistors having substantially identical compositions and substantially different effective junction areas,
means for connecting the output of said amplifier across the base-emitter junction of both said output transistor and said feedback transistor,



and means for connecting the collector of said feedback transistor to the input of said amplifier.

4,187,473
ELECTRONIC PHASE LOCKED LOOP CIRCUIT
Michael J. Cochran, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Division of Ser. No. 791,264, Apr. 27, 1977, Pat. No. 4,126,831.
This application May 8, 1978, Ser. No. 903,422
Int. Cl.[2] H03B *3/04*
U.S. Cl. 331—8 **2 Claims**



1. A phase locked loop circuit comprising:
(a) a sawtooth signal generator means having an input for receiving a reference clock signal, said generator means being responsive to said reference clock signal for generating a sawtooth-shaped signal with the same period as said reference clock signal;
(b) sample and hold circuit means comprised of:
(i) a first MOS transistor having source, drain and gate electrodes, the source electrode being coupled to said sawtooth generator means for receiving said sawtooth-shaped signal and the gate electrode being coupled to receive a digital sampling clock signal of selectively controllable clock rate;
(ii) an MOS load transistor;
(iii) an MOS source transistor serially coupled to said load transistor, said source transistor having a gate electrode coupled to the drain electrode of said first MOS transistor for receiving samples of said sawtooth-shaped signal and having a Miller capacitance for holding the most current sample of said sawtooth-shaped signal; and
(iv) output means coupled to said source transistor for generating a phase detection signal of a magnitude proportional to the magnitude of a sample held by said Miller capacitance;
(c) programmable counter means coupled to receive multibit digital commands from a digital processor means for generating said digital sampling clock signal at a clock rate selected according to said multibit digital commands;
(d) a voltage-controlled oscillator circuit coupled to the output means of said sample and hold circuit means, said oscillator circuit for generating an output clock signal at a

frequency proportional to the magnitude of said phase detection signal; and

(e) a feedback loop coupling said voltage-controlled oscillator circuit to said programmable counter means for selectively locking the phase locked loop circuit to a frequency selected by said digital processor means.

4,187,474

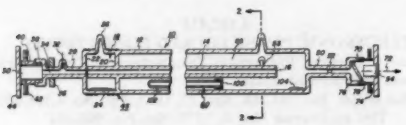
METAL VAPOR LASER DISCHARGE TUBE

William F. Hug, Pasadena; Randolph W. Hamerdinger, Glendora; Phillip D. Dunn, West Covina, and Robert C. McQuillan, Glendora, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 11, 1977, Ser. No. 823,553

Int. Cl.[2] H01S *3/02*

U.S. Cl. 331—94.5 D **8 Claims**



1. A gas laser comprising an envelope having opposite open ends; an active gaseous medium disposed within said envelope, said medium comprising a mixture of gases or materials including at least one component having a lower ionization potential than the ionization potential of at least one other component in said mixture; at least one anode and at least one cathode disposed within said envelope; means for applying a DC voltage between said anode and said cathode to provide a discharge in said active gaseous medium which results in stimulated emission gain for continuous wave generation of laser radiation; means adjacent to said anode for supplying the low ionization potential component of said gaseous mixture which flows after ionization by DC cataphoresis in the direction of said cathode during the continuous wave generation of said laser radiation; means for continuously removing said low ionization potential component from said gaseous mixture and from the path of said laser radiation after it has flowed over said mixture length; means disposed at the opposite ends of said gas envelope for sealing said envelope open ends; an active reservoir control which controls said low ionization potential component; and loss compensation means for said other component in said mixture, said loss compensation means comprising a member containing additional amounts of said other component, a predetermined amount of said additional other component entering into said envelope from said member during operation of said gas laser.

4,187,475

CONTINUOUSLY VARIABLE LASER OUTPUT COUPLER

Irwin Wieder, Los Altos, Calif., assignor to Analytical Radiation Corp., Los Altos, Calif.

Filed Jan. 5, 1978, Ser. No. 867,005

Int. Cl.[2] H01S *3/08*

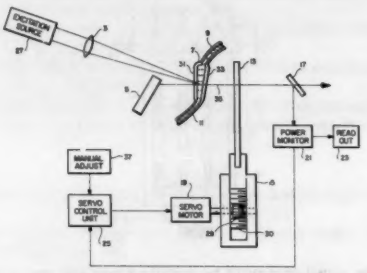
U.S. Cl. 331—94.5 S **12 Claims**

1. A method for optimizing the output of a laser comprising:

providing as part of a laser cavity an output mirror with a range of transmission values, said transmission values varying in a known way as a function of wavelength and position along a gradient,

monitoring the output power of said laser, and

moving said output mirror along a gradient in the plane of said output mirror so that said plane remains essentially



perpendicular to the laser beam axis, and until said monitored output power is optimized.

4,187,476

SHF BAND OSCILLATOR CIRCUIT USING FET

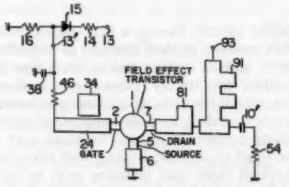
Keiro Shinkawa; Hiroji Shoyama, and Chuichi Sodeyama, all of Yokohama, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 30, 1978, Ser. No. 873,526

Claims priority, application Japan, Jan. 31, 1977, 52-8650; Jan. 31, 1977, 52-8651; Feb. 14, 1977, 52-14232; Feb. 14, 1977, 52-14233

Int. Cl.[2] H03B *5/04, 5/18*

U.S. Cl. 331—117 D **5 Claims**



1. An oscillation circuit using a field effect transistor which compensates for the change of an oscillation frequency due to a change of ambient temperature, and generates a signal at an SHF band frequency, comprising:

first means having an input terminal connected to a gate of said field effect transistor and applying feedback between an output terminal and the input terminal of said field effect transistor;

a microstrip line connected to the gate of said field effect transistor;

a first resistor having an impedance approximately equal to the characteristic impedance of said microstrip line and connected to a terminal end of said microstrip line;

second means including said first resistor and a temperature sensitive semiconductor device for applying a bias voltage to said gate wherein said bias voltage changes with the change of the ambient temperature; and

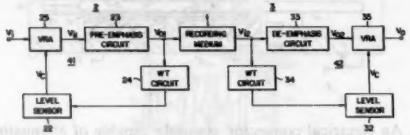
a resonator arranged adjacent to said microstrip line and having a resonance frequency approximately equal to a desired oscillation frequency.

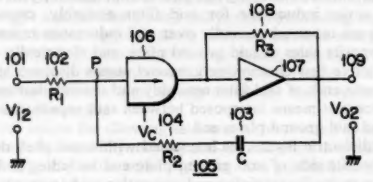
4,187,477

NOISE REDUCTION SYSTEM

Kenjiro Endoh; Motokazu Ohkawa, both of Yokohama; Kazuo Kitagawa, Kawasaki, and Hideshi Kira, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Oct. 21, 1977, Ser. No. 844,435
Claims priority, application Japan, Oct. 21, 1976, 51-126565
Int. Cl.[2] H04B 1/64
U.S. Cl. 333—14 8 Claims





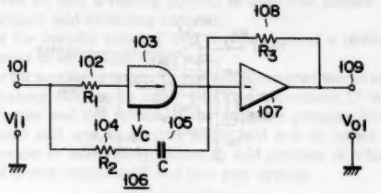
1. A noise reduction system having an encoder for compressing the dynamic range of an audio input signal in accordance with the amplitude thereof and for delivering the compressed audio signal to a signal transmission medium, and a decoder for expanding the dynamic range of an audio signal reproduced from the signal transmission medium in accordance with the amplitude thereof, said noise reduction system comprising: a first controlled amplifier circuit provided in the encoder in which, when the input signal is in the low- and middle-level, the high-frequency range of the signal is sufficiently emphasized and, when the signal is high, the emphasis quantity in the high-frequency range is restrictive; and the decoder including a second controlled amplifier circuit having a transfer function related to that of said first controlled amplifier circuit substantially in inverse-function manner; said second controlled amplifier including a voltage-current converting circuit for converting the voltage of the reproduced audio signal into current and a first variable response amplifier having a series circuit including a capacitor and a resistor connected at one end to the output of the voltage-current converting circuit and at the other end to the output terminal of the variable response amplifier, a current amplifier with variable gain for amplifying current obtained from the connection point between said voltage-current converting circuit and said series circuit, and a current-voltage converting circuit for converting the output current of said current amplifier into voltage to be directed to the output terminal of the decoder through the output terminal of the first variable response amplifier.

4,187,478

NOISE REDUCTION SYSTEM HAVING SPECIFIC ENCODER CIRCUITRY

Kenjiro Endoh; Motokazu Ohkawa, both of Yokohama; Kazuo Kitagawa, Kawasaki, and Hideshi Kira, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Oct. 21, 1977, Ser. No. 844,436
Claims priority, application Japan, Oct. 21, 1976, 51-126564
Int. Cl.[2] H04B 1/64
U.S. Cl. 333—14 8 Claims



1. A noise reduction system having an encoder for compressing the dynamic range of an audio input signal in accordance with the amplitude thereof and for delivering the compressed audio signal to a signal transmission medium, and a decoder for expanding the dynamic range of an audio signal reproduced from the signal transmission medium in accordance with the amplitude thereof, said noise reduction system comprising: a first controlled amplifier circuit provided in the encoder in which, when the input signal is in the low- and middle-level, the high-frequency range of the signal is sufficiently emphasized and, when the signal is high, the emphasis quantity in the high-frequency range is restrictive; and a second controlled amplifier circuit provided in the decoder and having a transfer function related to that of said first controlled amplifier circuit substantially in inverse-function manner; said first controlled amplifier circuit including a first variable response amplifier having a first resistor connected at one end to the input terminal of the encoder, a current amplifier with variable gain for amplifying current extracted from the other end of said first resistor, a series circuit having a second resistor and a capacitor and connected at one end to the input terminal of the encoder, and means for adding the output current of the other end of the series circuit with the output current of the current amplifier and means for converting the summed current into voltage directed to the output terminal of the encoder.

4,187,479

VARIABLE EQUALIZER

Kohei Ishizuka, Hachioji; Yoshitaka Takasaki, Tokorozawa; Yasuhiro Kita, Hachioji; Yoshinori Nagoya, Yokohama, and Takeo Kusama, Chigasaki, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 13, 1977, Ser. No. 860,098
Claims priority, application Japan, Dec. 22, 1976, 51/153377
Int. Cl.[2] H03H 7/14
U.S. Cl. 333—28 R 6 Claims

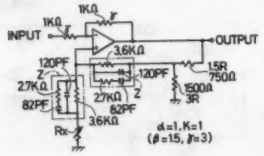
1. In a variable equalizer comprising:

a differential amplifier. which has a first anti-phase input terminal, a second in-phase input terminal, and an output

terminal forming the output terminal of the variable equalizer;

a first circuit which applies a voltage of an input signal to-be-equalized which is applied to an input terminal of said variable equalizer to the first anti-phase input terminal of the differential amplifier, said first circuit including a first resistance element which is connected between said input terminal of said variable equalizer and said first anti-phase input terminal, and a second resistance element which is connected between said output terminal of said variable equalizer and said first anti-phase input terminal; and

a second circuit which applies a voltage of said input signal to-be-equalized which is applied to said input terminal of said variable equalizer to the second in-phase input terminal of the differential amplifier, said second circuit including a voltage divider having a voltage dividing terminal, one end of which voltage divider is connected to one of said input terminal and said output terminal of said variable equalizer and the other end of which is grounded, and first and second impedance circuits and a variable resistor which are connected in series between said voltage dividing terminal and ground with the first impedance circuit connected to said voltage dividing terminal, the second impedance circuit connected to the first impedance circuit, and the variable resistor connected between the second impedance circuit and ground, wherein a junction point between said first and second impedance circuits is connected to said second in-phase input terminal of said differential amplifier.



4,187,480

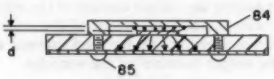
MICROSTRIP NETWORK HAVING PHASE ADJUSTMENT

Richard F. Frazita, Deer Park, N.Y., assignor to Hazeltine Corporation, Greenlawn, N.Y.

Division of Ser. No. 783,237, Mar. 31, 1977, Pat. No. 4,117,494. This application May 12, 1978, Ser. No. 905,496

Int. Cl.[2] H01P *3/08, 1/18, 9/00*

U.S. Cl. 333—161 **2 Claims**



1. A phase adjustable microstrip transmission line comprising:

a ground plane;

a dielectric substrate attached to said ground plane;

a conductive strip attached to said substrate; and

a conductive plate on the side of said strip away from said substrate and separated from said strip by a selected spacing and having a length in the direction of said conductive strip which corresponds to an integral number of half wave lengths of a signal on said microstrip to thereby vary the fields of signals on said microstrip so as to adjust the transmission phase of said transmission line.

4,187,481

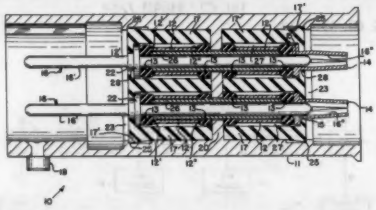
EMI FILTER CONNECTOR HAVING RF SUPPRESSION CHARACTERISTICS

Kamal S. Boutros, Downsview, Canada, assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Dec. 23, 1977, Ser. No. 863,642

Int. Cl.[2] H03H *17/04, 13/00;* **H01R** *17/10, 17/12*

U.S. Cl. 333—182 **6 Claims**



1. An electrical connector assembly capable of attenuating electromagnetic and radio frequency interference comprising:

an electrically conductive shell including a generally transverse ground plate formed integrally therewith;

at least one elongated electrical contact member extending longitudinally within said shell and through an aperture in said ground plate;

a filter assembly associated with said contact member including means mounted coaxially over said contact member and also extending through said aperture for providing a series inductance for said filter assembly, capacitor means mounted coaxially over said inductance means on opposite sides of said ground plate, and electrically conductive first elastomeric grommet means disposed at opposite ends of said filter assembly and second elastomeric grommet means interposed between said capactor means and said ground plate; and

two dielectric inserts, each retained within said shell on an opposite side of said ground plate and including at least one cavity for receiving and supporting said contact member and its associated filter assembly, said insert cavity having a length such that said grommet means are axially compressed to resiliently support said filter assembly.

4,187,482

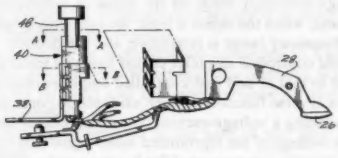
MULTIPLE CAPACITY CIRCUIT BREAKER

Russell R. Kosup, Laguna Niguel, Calif., assignor to Unicorn Industries, Anaheim, Calif.

Continuation-in-part of Ser. No. 752,393, Dec. 20, 1976, abandoned. This application Jan. 9, 1978, Ser. No. 867,712

Int. Cl.[2] H01H *9/00*

U.S. Cl. 335—12 **22 Claims**



1. A circuit breaker comprising:

a housing, an overload current responsive trip mechanism mounted in the housing, the trip mechanism including a current sensitive element forming a first load current conductive path for activating the trip mechanism in response to the level of current through said first path, and switch means forming at least one shut load current conductive path in parallel with said first path, the switch means selectively opening or closing the current path in

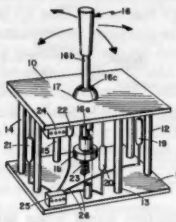
shunt with the current sensitive element to change the current rating of the circuit breaker.

4,187,483

MULTI-THROW MAGNETIC REED SWITCH

C. David Whitney, 9320 Earl St., Apt. #28, La Mesa, Calif. 92041

Filed Aug. 30, 1978, Ser. No. 938,221
Int. Cl.[2] H01H *9/00*
U.S. Cl. 335—206 **10 Claims**



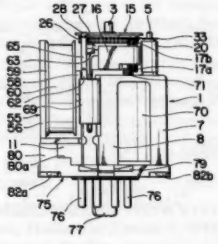
1. A multi-throw magnetic switch comprising:
a pair of spaced apart parallel plates, one of said plates having a hole through it;
a first plurality of reed switches lying between and perpendicular to said plates, said reed switches being equal distant from said hole and equal distant from each other;
a single control arm having one portion protruding through said hole to approximately midway between said plates, and having a second portion extending above said hole;
a permanent magnet means fixedly mounted on said one portion of said arm at approximately midway between said plates; and
pivot means for allowing said arm to be pivoted about said hole by manually moving said second portion of said arm to thereby move said magnet in close proximity with, and thereby close, selectable ones of said reed switches.

4,187,484

TIMING DEVICE UTILIZING A UNIQUE CLUTCH ASSEMBLY

Isamu Ohara, Okayama; Tsutomu Muranaka, Tamano, and Hideo Eizumi, Okayama, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Oct. 4, 1977, Ser. No. 839,304
Claims priority, application Japan, Oct. 12, 1976, 51-122559; Mar. 9, 1977, 52-26381; May 23, 1977, 52-59592
Int. Cl.[2] H01H *3/54*
U.S. Cl. 335—75 **9 Claims**



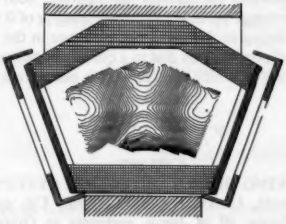
1. A timing device comprising:
A motor having an output shaft;
a driven element having a cam surface mounted thereon, said cam surface including an actuating portion;
a clutch means comprising a first gear selectively engageable with said output shaft and a second gear continuously engaged with said driven element for moving the same, said first and second gears being mounted on a common shaft;
an arm rotatably mounted holding said first and second gears;
means for rotatably biasing said arm to a position at which said motor output shaft and first gear engage;
electromagnet means having an armature which normally pressably rotates said arm against the force of said biasing means to a position at which said motor output shaft disengages from said first gear;
a switching element for selectively supplying power to said motor when actuated;
means engaged with said cam surface and initially moved by a first movement of said armature for actuating said switching element, said means for actuating being further moved by said actuating portion of said cam surface to deactuate said switching element;
means for initially rotating said driven element a desired amount to set a delay time; and
means for supplying power to said electromagnet means and switching element to cause said first movement of said armature and the release of the armature pressing force against said arm to thereby allow said arm to rotate in response to said biasing means to said position at which said motor output shaft and first gear engage.

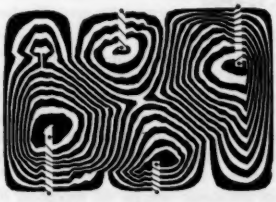
4,187,485

COIL ARRANGEMENT FOR ELECTROMAGNETICALLY INFLUENCING MAGNETIC FIELDS, IN PARTICULAR FOR HOMOGENIZING MAGNETIC DIPOLES

Hermann Wollnik, No. 30, Auf der Platte, 6301 Fernwald, Fed. Rep. of Germany

Filed Dec. 12, 1977, Ser. No. 859,910
Claims priority, application Fed. Rep. of Germany, Dec. 31, 1976, 2659775
Int. Cl.[2] H01F *5/00*
U.S. Cl. 335—299 **10 Claims**





1. An arrangement for homogenizing a magnetic field between two pole shoe surfaces of a magnet comprising:
(a) at least one correction coil adjacent to each pole shoe surface;

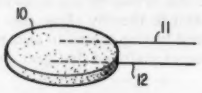
(b) each coil comprising a carrier of insulating material, an areal arrangement of a plurality of electrically conductive strips fixed to at least one side thereof and located along lines of magnetic flux and mutually spaced by a stable magnetic field intensity, the width of said electrically conductive strips corresponding to a predetermined fraction of the field intensity difference between adjacent strips, and means connecting said electrically conductive strips in series to form at least one current circuit.

4,187,486

OXYGEN CONCENTRATION DETECTING ELEMENT AND METHOD OF PRODUCING THE SAME

Hideaki Takahashi, Aichi, and Takashi Takeuchi, Nagoya, both of Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Apr. 20, 1978, Ser. No. 898,372
Claims priority, application Japan, Apr. 20, 1977, 52-45589
Int. Cl.[2] H01L *49/00*; H01B *1/02*
U.S. Cl. 338—34 **17 Claims**



1. An oxygen concentration detecting element which is an electrical resistance element for the detection of oxygen concentration in the exhaust gases of internal combustion engines comprising a shaped molded and sintered porous body consisting essentially 70 to 99 weight percent of oxide-semiconductor material selected from the group consisting of titanium oxide, cerium oxide, niobium oxide, tantalum oxide, cobalt oxide and hafnium oxide and 1 to 30 weight percent of platinum particles sintered together with the powder form of said oxide semiconductor material, said platinum particles being dispersed substantially uniformly throughout said porous body thus obtained at an average particle-to-particle spacing of 0.1μ to 10μ, said element being so designed that a change in the resistance of the sintered porous body due to a change in oxygen concentration of gases in which the element is placed may be measured.

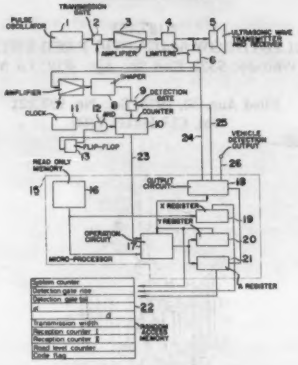
4,187,487

MOVING OBJECT DETECTION SYSTEM

Hiroshi Numata, Otokuni; Akihiko Otani, Uji, and Masao Mizuno, Kyoto, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Apr. 28, 1978, Ser. No. 901,396
Claims priority, application Japan, Apr. 28, 1977, 52-49124; Apr. 28, 1977, 52-49465
Int. Cl.[2] G01S *9/66*
U.S. Cl. 367—93 **11 Claims**

1. A detection system for detecting the presence of moving objects and the like through utilization of ultrasonic energy which comprises a predetermined location provided in a memory unit and having stored therein time from transmission of ultrasonic energy till reception of reflected energy corresponding thereto from a standard surface, means for computing the difference a between the immediately preceding time from transmission of ultrasonic energy till reception of reflected energy corresponding thereto stored in said predetermined location and current time from transmission of ultrasonic energy and reception of reflected energy corresponding thereto, means for storing in said predetermined location said current time from transmission of ultrasonic energy till reception of reflected energy corresponding thereto when the difference a is smaller than a predetermined time α and means for outputing



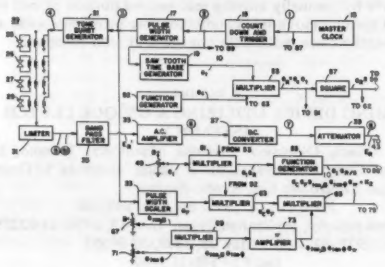
a moving object detection signal when said difference a is larger than a preset time β which is larger than said time α.

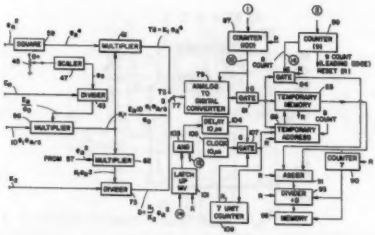
4,187,488

REVERBERATION BACKSCATTER MEASUREMENT SYSTEM

William B. Anderson, Silverdale, and David B. Markwald, Bremerton, both of Wash., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 20, 1978, Ser. No. 888,080
Int. Cl.[2] G01S *9/66*
U.S. Cl. 367—13 **9 Claims**





1. A reverberation backscatter measurement system comprising:

(a) means for transmitting an acoustic signal in a fluid environment;

(b) means for receiving reflected acoustic signals of said

transmitted acoustic signal from a target and for converting said reflected acoustic signal into a corresponding electrical signal;

(c) means for calibrating and adjusting said electrical signal against a standard signal, said calibrating means receiving as input said electrical signal;

(d) first correction means receiving as input the output of said calibrating means, said first correction means providing an output signal representing the acoustic target strength of said reflected acoutic signal corrected for velocity of sound in said fluid medium in situ and for the frequency used for said transmitted signal;

(e) second correction means receiving as input the output of said calibrating means, said second correction means providing a parallel output signal to said output of said first correction means representing said acoustic target strength per unit volume of fluid medium of said reflected acoustic signal corrected for the wide and narrow beam angles of said transmitting means and for the pulse length of said transmitted signal; and

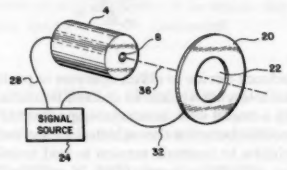
(f) means for selecting for analysis said output signal of said first correction means representing acoustic target strength of said reflected acoustic signal or said output of said second correction means representing acoustic target strength of said reflected acoustic signal per unit volume of said fluid medium.

4,187,489

METHOD AND APPARATUS FOR PROPAGATING ELECTRICAL SIGNALS THROUGH A CONDUCTING DIELECTRIC FLUID

Paul A. Silberg, 2002 Woody Dr., Billings, Mont. 59102

Filed Apr. 27, 1978, Ser. No. 900,767
Int. Cl.[2] H04B *13/02*
U.S. Cl. 340—852 **17 Claims**



1. Apparatus for producing an electrical signal for transmission through a conducting dielectric fluid comprising

a first electrode immersed in the fluid coincident with a certain axis, said electrode having predetermined height and width dimensions,

a second electrode immersed in the conducting fluid along said axis and axially spaced from said first electrode, said second electrode having a generally planar profile with height and width dimensions greater than the height and width dimensions of said first electrode,

means for applying electrical energy to said first and second electrodes to produce a time-varying voltage difference and thus a non-uniform electric field therebetween.

4,187,490

RANGE DETERMINING SYSTEM

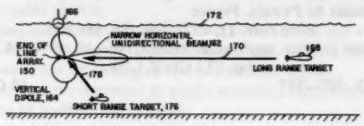
Samuel S. Ballard, Hollis, and Ronald P. White, Amherst, both of N.H., assignors to Sanders Associates, Inc., Nashau, N.H.

Filed Aug. 3, 1978, Ser. No. 930,834
Int. Cl.[2] G01S *3/80*
U.S. Cl. 367—121 **7 Claims**

1. A method for acoustically distinguishing between short range and long range targets within a body of water comprising the steps of:

providing acoustic sensing means having a vertical dipole pattern;

providing acoustic sensing means having a horizontal pattern; and



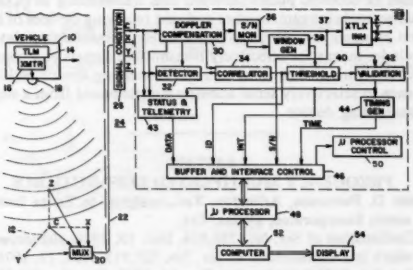
detecting in which of said patterns acoustic energy from said targets is located, whereby, depending on the pattern, it can be ascertained whether the energy is coming from a short range or long range target.

4,187,491

DOPPLER COMPENSATED PSK SIGNAL PROCESSOR

Alan L. Lindstrum, Bainbridge Island, and Jay V. Chase, Poulsbo, both of Wash., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 7, 1978, Ser. No. 931,691
Int. Cl.[2] G01S *5/18*
U.S. Cl. 367—125 **17 Claims**



1. A Doppler compensated PSK signal processor for underwater acoustic telemetry messages having an identity code portion and a status and telemetry portion, said messages being transmitted from a plurality of vehicles moving relative to a sensor array and to each other, comprising means for processing independently said telemetry message received by each sensor of said sensor array, said processing means for each sensor comprising:

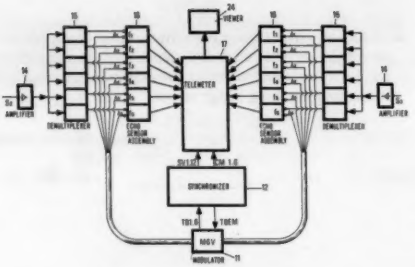
(a) means for generating a plurality of timing signals from said received telemetry message, said timing signals tracking the carrier frequency of said received telemetry message to compensate for Doppler frequency shifts due to the movement of the particular transmitting vehicle relative to said sensor array; and

(b) means for validating said received telemetry message and generating a timing mark upon recognition of a valid identity code for said particular transmitting vehicle, said validating and generating means being Doppler compensated by said timing signals, and said timing mark establishing a time which is a function of the range of said particular transmitting vehicle from said sensor.

4,187,492
DEVICE FOR DETERMINING THE RELATIVE POSITION OF ELONGATE MEMBERS TOWED BEHIND A SHIP

Robert Delignieres, Mareil Marly, France, assignor to Institut Francais du Petrole, France

Filed Nov. 11, 1977, Ser. No. 850,835
Claims priority, application France, Nov. 18, 1976, 76 35162
Int. Cl.[2] G01V *1/38*
U.S. Cl. 367—127 10 Claims

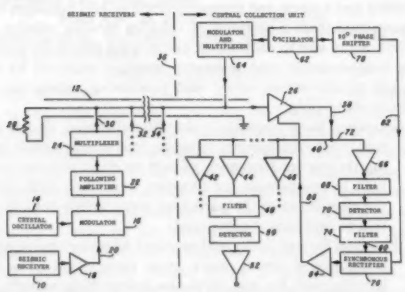


1. A device for determining the relative position of at least a first elongate member with respect to a second elongate member, both members being towed behind a ship, comprising a plurality of devices for transmitting acoustic pulses, distributed along said second member, a plurality of devices for receiving transmitted acoustic pulses, distributed along said first member and a telemetrical system for measuring the relative distance between the elongate members by determination of the travel times of acoustic pulses between said transmitting devices of said second elongate member and said receiving devices of said first elongate member, and wherein each transmitting device includes means for selectively transmitting signals at a respective determined frequency and each receiving device includes means to selectively sense acoustic signals issued from a single transmitting device.

4,187,493
FREQUENCY MULTIPLEXED SEISMIC CABLE

John D. Patterson, Arlington, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 750,024, Dec. 13, 1976, abandoned, which is a continuation of Ser. No. 527,913, Nov. 27, 1974, abandoned. This application Jun. 12, 1978, Ser. No. 914,709
Int. Cl.[2] G01V *1/22*
U.S. Cl. 367—135 12 Claims



1. In a seismic cable for electrically coupling the signals induced at a plurality of seismic receivers to a central collecting unit, the improvement comprising:

(a) a transmission line located in said cable for providing an output signal at said central collecting unit,

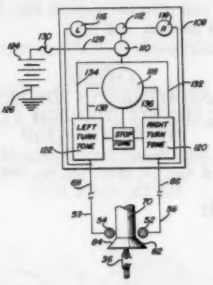
(b) means at at least two of said seismic receivers for modulating a carrier signal with a signal representative of the seismic receiver signal, the frequencies of said carrier signals being mutually distinct at at least two of said seismic receivers, and

(c) means for impressing the modulated signals on said transmission line, said means for impressing further comprising a summing amplifier with a first input for receiving the modulated signals and a second input matched to the characteristic impedance of said transmission line for receiving signals appearing on said transmission line, and having an output impedance matched to the characteristic impedance of said transmission line for coupling the summed signals to said transmission line.

4,187,494
VEHICLE GUIDANCE DEVICE

John W. Jessee, 2481 Roland Rd., Sacramento, Calif. 95821

Filed Nov. 4, 1977, Ser. No. 848,713
Int. Cl.[2] B60Q *1/00*
U.S. Cl. 340—52 R 9 Claims



1. A guidance device to aid an operator in positioning a hitch element on a towing vehicle in desired relationship to a hitch element on a towed vehicle comprising a flexible tension member connectible between the vehicles, means mounted on one of said vehicles to maintain tension in said tension member as the towing vehicle is maneuvered in relation to the towed vehicle, sensing means mounted on one of said vehicles and engageable by the flexible tension member to sense the angular relation of the flexible tension member to said one vehicle and the linear position of the flexible tension member in relation to said one vehicle, an indicator means actuated in response to the sensing means to provide signals to the operator of the towing vehicle to enable the operator to maneuver the towing vehicle properly as it approaches the towed vehicle and to stop the towing vehicle when the towing vehicle is positioned with the hitch element thereon accurately positioned in desired relationship both laterally and longitudinally with respect to the hitch element on the towed vehicle, said indicator means signals providing distinguishable audible signals to the towing vehicle operator representing said angular relation and linear position of said flexible tension member without requiring the operator to visually observe the indicator means.

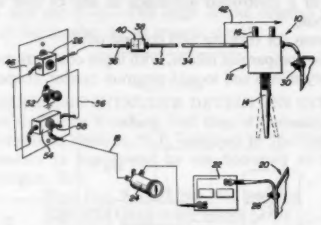
4,187,495
LOW TIRE PRESSURE WARNING SYSTEM

Walter A. Mitchell, P.O. Box 126, Redway, Calif. 95560

Filed Feb. 27, 1978, Ser. No. 881,720
Int. Cl.[2] B60C *23/06*
U.S. Cl. 340—58 9 Claims

1. A low tire pressure warning system for vehicles equipped with pneumatic tires, said system including at least one actuating switch for support from a portion of a vehicle from which

a wheel thereof equipped with a pneumatic tire is journaled, said switch including a depending 360 degree wobble actuator for contact with the ground closely adjacent the point of contact of said tire with the ground or contact with the adjacent side wall portion of said tire when the latter becomes deflated and the side wall bulges laterally outwardly adjacent the point of contact of the tire with the ground, said switch being serially connected in a main circuit in which a source of electrical potential is also serially connected, and first electrical audible signal generating means also serially connected in said circuit, said actuating switch being normally open and being closable upon said wobble actuator being laterally de-



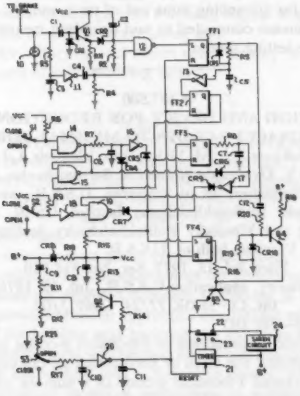
flected adjacent its lower end beyond a predetermined extent, said circuit including bypass circuit, in which said source is serially connected, connected in parallel with the first mentioned circuit and bypassing said signal generating means and said switch, said bypass circuit including second electrical visual signal generating means serially connected therein, and control switch means including control means for selectively bypassing that portion of said main circuit in which said audible signal generating means is serially connected and actuating said bypass circuit in which said visual signal generating means is serially connected or bypassing said bypass circuit and actuating that portion of said main circuit in which said audible signal generating means is serially connected.

4,187,496

KEYLESS VEHICLE INTRUSION ALARM

Michael L. Kovens, Randallstown, and Henry H. Hoge, Baltimore, both of Md., assignors to Universal Security Instruments, Inc.

Filed Dec. 12, 1977, Ser. No. 859,975
Int. Cl.[2] B60R *25/10*
U.S. Cl. 340—63 **7 Claims**



1. An intrusion alarm system for a vehicle having a plurality of doors for egress and ingress to a passenger compartment, said system comprising:

an armable circuit;

first circuit means responsive to momentary actuation of a predetermined accessory of said vehicle for arming said armable circuit;

sensing means associated with each of said doors and responsive to opening of that door when said armable circuit is armed for providing an alarm actuation signal;

alarm means responsive to alarm actuation signal for sounding an audible alarm signal;

egress delay means responsive to arming of said armable circuit for establishing a first delay interval during which said alarm means is prevented from responding to intrusion into said vehicle to permit an authorized vehicle operator to egress from the vehicle;

disarming means for permitting selective disarming of said armable circuit;

ingress delay means responsive to said armable circuit being armed and to opening of only a predetermined one of said doors for establishing a second delay interval; and

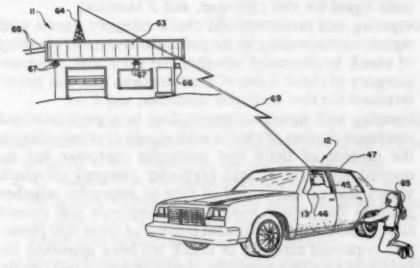
means for delaying sounding of said audible alarm signal during said second delay interval to permit an authorized operator of said vehicle to actuate said disarming means.

4,187,497

PORTABLE VEHICLE ALARM SYSTEM

Steven G. Howell, Dogwood La., Wake Forest, N.C. 27587, and Orville F. Harless, 2506 Briarwood Dr., Burlington, N.C. 27215

Filed Mar. 22, 1978, Ser. No. 888,844
Int. Cl.[2] B60R *25/10*
U.S. Cl. 340—65 **10 Claims**



1. An alarm system comprising: a remote receiver; alarm means operatively connected to said receiver; a plurality of portable transmitters; trip means operatively connected to each of said transmitters; motion sensitive closure means operatively connected to each of said trip means whereby when one of said transmitters is disturbed, said motion sensitive closure will activate said trip means to cause said transmitter to transmit a signal to said receiver which will activate said alarm means; and visual indicator means operatively connected to each of said transmitters and viewable exteriorly thereof for visually indicating when said transmitter has been tripped whereby, when one of the plurality of portable transmitters adapted to send an alarm signal to a single remote receiver has been tripped, such tripped transmitter can be readily located for resetting.

4,187,498

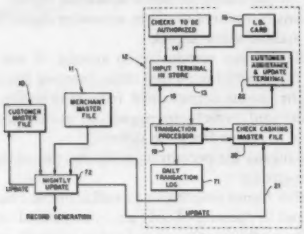
CHECK VERIFICATION SYSTEM

Robert V. Creekmore, Marietta, Ga., assignor to 1st National Bank, Atlanta, Ga.

Division of Ser. No. 619,663, Oct. 6, 1975, Pat. No. 4,109,238. This application Feb. 2, 1978, Ser. No. 874,691

Int. Cl.[2] H04Q *9/00*

U.S. Cl. 340—149 A **5 Claims**



1. Method of verifying the check presentation history of a number of persons who may present various types of checks for acceptance, comprising the steps of:

establishing signals corresponding to predetermined categories of checks which each individual customer may desire to present;

establishing signals corresponding to a predetermined maximum number of checks, for each of said check categories that are predetermined for such individual customer, which will be approved for acceptance if presented by such individual customer within a certain period of time;

establishing signals corresponding to a separate customer-supplied predetermined personal authorization code for each individual customer;

at the time of each present request by a customer for acceptance of a particular category of check accompanied by signals corresponding to a customer-furnished possible personal code, initially comparing said possible personal code signals for identity with said predetermined personal code signal for that customer, and if identical;

comparing said predetermined check category signals with signals corresponding to the particular requested category of check to determine whether the particular requested category of check is one of the categories that was predetermined for that particular customer, and if so;

comparing said signals corresponding to a predetermined maximum number of checks with signals corresponding to the number of times that particular customer has requested approval of said particular category of check within said certain period of time to determine whether granting the present request for acceptance will exceed said predetermined maximum number of times said particular requested category of check has been approved for acceptance for that particular customer within said certain period of time, and if not;

providing a signal corresponding to approval of said present request for acceptance.

4,187,499

ELECTRICAL PROGRAMMER FOR THE AUTOMATIC CONTROL OF A HOUSEHOLD APPLIANCE

Erich Scheer, St. Georgen-Peterzell, Fed. Rep. of Germany, assignor to KUNDO - Kieninger & Obergfell, St. Georgen/Schwarzwald, Fed. Rep. of Germany

Filed Sep. 20, 1977, Ser. No. 834,873

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1976, 2642188

Int. Cl.[2] H04Q *3/00*

U.S. Cl. 340—309.1 **13 Claims**

1. A system for the automatic control of an electrical appliance to be sequentially stepped through a predetermined number of operating phases, comprising:

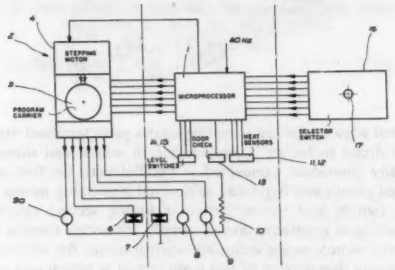
a read-only memory for storing a multiplicity of instruction codes defining consecutive phases of a maximum operating program;

electronic counting means connected to said read-only memory for sequentially addressing same to read out said instruction codes in a predetermined order of succession;

a rotatable control unit including a program carrier generating, in successive working positions, a multiplicity of signal patterns respectively corresponding to said instruction codes, said control unit further having output means for the selective activation and deactivation of components of a controlled appliance in any of said working positions;

drive means for rotating said control unit;

electronic comparison means, with input connections to said memory means and to said program carrier, connected to



said drive means for arresting said control unit upon detecting a match between an instruction code emitted by said memory means and a signal pattern generated by said program carrier;

a source of stepping pulses connected to said counting means for progressively advancing same to command the sequential readout of successive instruction codes of said maximum operating program;

presettable decoding means connected to said read-only memory in parallel with said comparison means for detecting certain instruction codes pertaining to unwanted phases of said maximum operating program and, in response to such detection, inhibiting the arresting of said drive means by said comparison means with simultaneous emission of a phase-skipping pulse fed to said counting means for advancing same out of turn; and

selector means connected to said decoding means for varying the setting thereof.

4,187,500

METHOD AND DEVICE FOR REDUCTION OF FIBONACCI P-CODES TO MINIMAL FORM

Alexei P. Stakhov; Jury M. Vishnyakov; Vladimir A. Luzhetsky; Alexandr V. Ovodenko; Nikolai A. Solyanichenko, and Alexandr V. Fomichev, all of Taganrog, U.S.S.R., assignors to Taganrogsky Radiotekhnichesky Institut, USSR, Taganrog, Taganrog and Vinnitsky Politekhnichesky Institut, USSR, Vinnitsa, Vinnitsa, both of, U.S.S.R.

Filed Jul. 15, 1977, Ser. No. 816,510

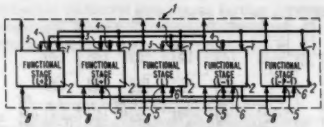
Claims priority, application U.S.S.R., Jul. 19, 1976, 2386002

Int. Cl.[2] H03K *13/24*; G06F *5/00*

U.S. Cl. 340—347 DD **21 Claims**

1. A method of reduction of Fibonacci p-codes to minimal form, comprising the steps of performing all convolutions of bits of an original Fibonacci p-code of a number whereto an original combination of binary signals corresponds, processing said original combination of binary signals by replacing a

binary signal corresponding to a 0 value of the lth digit of the original Fibonacci p-code of the number by its inverse signal,



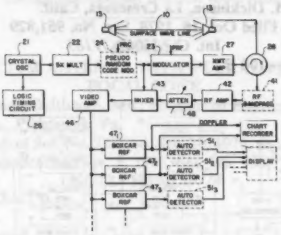
and replacing binary signals corresponding to 1 values of the (l−1)th and the (l−p−1)th digit of the original Fibonacci p-code of the number by its inverse signal.

4,187,501

ELECTRONIC INTRUDER DETECTION SYSTEM

Reinhard G. Olesch, Kronberg, Fed. Rep. of Germany, and Otto E. Rittenbach, Neptune, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 7, 1977, Ser. No. 840,206
Int. Cl.[2] G01S *9/06*; G08B *13/24*
U.S. Cl. 340—554 **18 Claims**



1. An electronic intrusion detection system, which comprises:

a transmission line;

means for launching radio frequency energy onto one end of said line, said launching means comprising a radio-frequency generator, means for phase-modulating the output of said radio-frequency generator with a pseudo-random code, and means for pulse-modulating the output of said phase-modulating means;

the intrusion of a target into a defined region of space about said line causing a return echo; and

means for detecting said return echo thereby to detect the presence of said intruding target.

4,187,502

SWIMMING POOL ALARM SYSTEM

Frank O. Beverly, 2396 Via Camino, Carmichael, Calif. 95608, and Karl H. Nagel, 1025 NW. 66th Ter., Margate, Fla. 33063

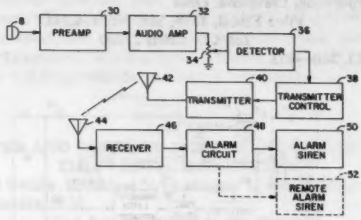
Filed Dec. 12, 1977, Ser. No. 859,301
Int. Cl.[2] G08B *13/22*
U.S. Cl. 340—566 **14 Claims**

1. A swimming pool alarm system comprising

water-resistant hydrophone means for generating signals in response to received pressure variations in a range of frequencies between approximately 100 Hz and 10 kHz,

means for holding said hydrophone means immersed in a swimming pool, said holding means substantially mechanically decoupling said hydrophone means, whereby said hydrophone means is responsive to substantially only pressure waves in the swimming pool,

circuit means connected to said hydrophone means for generating an alarm signal when the signals from said hydrophone means exceed a predetermined threshold, and



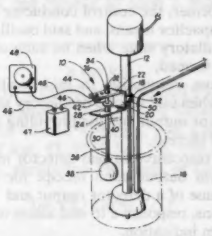
alarm means for generating a physically discernible alarm in response to said alarm signal.

4,187,503

SUMP ALARM DEVICE

Robert G. Walton, 8415 Limerick, Wichita, Kans. 67206

Filed Sep. 5, 1978, Ser. No. 939,365
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—624 **1 Claim**



1. A sump alarm device adapted for receipt on a vertical pump shaft of a sump pump, the sump pump disposed in a sump for pumping water therefrom, the device comprising:

a "U" shaped float rod guide having a vertical base with two outwardly extending horizontal arms, the arms including an upper arm and a lower arm, the upper arm and the lower arm having apertures therethrough;

a screw clamp adapted for receipt around the vertical pump shaft of the sump pump, said screw clamp attached to the vertical base of said float rod guide;

a vertical float rod slidably received through the apertures in the upper and the lower arms of said float rod guide;

a float mounted on the lower end of said float rod;

a microswitch attached to the upper arm of said rod guide and having a switch lever extending outwardly therefrom and disposed adjacent said float rod;

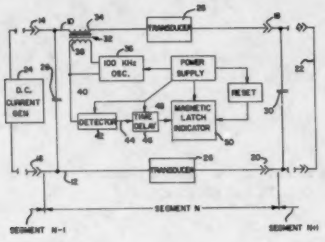
a switch lever trip mounted on said rod and disposed between the upper and lower arms of said rod guide, said switch lever trip disposed below said switch lever, said switch lever trip contacting said switch lever and closing said microswitch when said switch lever trip is raised on said rod; and

a battery operated alarm electrically connected to said microswitch, said alarm activated when said switch is closed.

4,187,504
FAULT MONITORING AND INDICATOR SYSTEM

Henry L. Cantrell, Urbana, Ohio, assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Feb. 3, 1978, Ser. No. 874,771
Int. Cl.[2] G08B 21/00
U.S. Cl. 340—652 7 Claims



1. A continuity monitor and indicator circuit for monitoring the continuity of a segment of a pair of control conductors along which a control current flows, comprising:

a capacitor means at each end of said segment of said control conductors bridging said conductors and providing an a.c. electrical path therebetween,

a transformer having its secondary winding connected in series with one of said control conductors in said segment,

oscillator means including a tank circuit connected to the primary winding of said transformer and having an oscillator output, said tank circuit being such that said oscillator output is in a first oscillatory state when a closed a.c. electrical loop is provided by the secondary winding of said transformer, the control conductor segment, and the bridging capacitor means, and said oscillator output is in a second oscillatory state when no such closed a.c. electrical loop is formed,

detector means, responsive to said oscillator output, for detecting when said second oscillatory state is provided at said oscillator output and for providing a detector output in response thereto,

delay means, responsive to said detector means, for providing an alarm output upon receipt for a predetermined period of time of a detector output and

indicator means, responsive to said alarm output for providing an alarm indication,

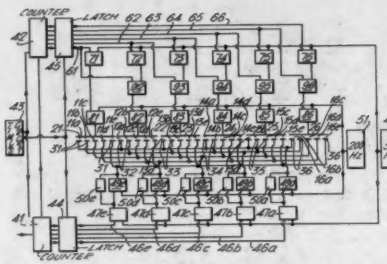
whereby interruption in the continuity of said closed a.c. electrical loop is detected and an alarm indication provided in response thereto.

4,187,505
DISPLAY APPARATUS

Colin A. Morley, Caterton; Richard N. Thomas, Weybridge, and Bela Kollar, Hollington, all of England, assignors to Smiths Industries Limited, London, England

Filed Oct. 31, 1977, Ser. No. 847,386
Claims priority, application United Kingdom, Oct. 29, 1976, 45040/76
Int. Cl.[2] G01D 7/00
U.S. Cl. 340—753 9 Claims

1. Display apparatus for displaying the magnitude of a physical parameter, comprising a plurality of electrically-operable display regions each of which contains a plurality of electrically-operable display sections, means for supplying an electric signal representative of the said magnitude, and electric circuit means responsive to the said electric signal to operate the said display sections in a cyclic manner in accordance with the electric signal to provide a representation of the said magnitude, each said cycle of operation of the display regions having first and second periods, the said electric circuit means include first means operable during the said first period of each cycle to effect operation of any said display region in which all display sections therein require to be operated, and second means operable during said second period of each cycle to

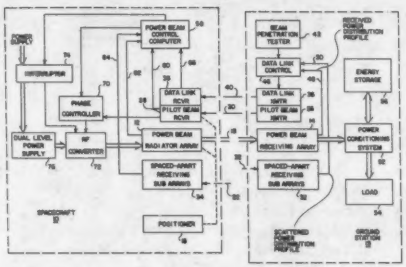


effect operation of any said display region in which one of the display sections thereof requires to be operated.

4,187,506
MICROWAVE POWER TRANSMISSION BEAM SAFETY SYSTEM

Robert A. Frosch, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Richard M. Dickinson, La Crescenta, Calif.

Filed Oct. 16, 1978, Ser. No. 951,829
Int. Cl.[2] H04B 7/185
U.S. Cl. 343—100 R 23 Claims



16. In a method of transmitting a microwave power beam between a microwave power beam radiator array and a microwave power beam receiving antenna array, the improvement comprising:

sensing power profiles to determine if an object is within said microwave power transmission beam; and

controlling said microwave power transmission beam in accordance with said sensing step.

4,187,507
MULTIPLE BEAM ANTENNA ARRAY

Patrick E. Crane, Tampa; Robert E. Lazarchik, Largo, both of Fla., and Arthur H. Schaufelberger, deceased, late of New Port Richey, Fla. (by Ruth L. Schaufelberger, administratrix), assignors to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 13, 1978, Ser. No. 951,216
Int. Cl.[2] H01Q 19/06, 13/00, 3/26
U.S. Cl. 343—754 10 Claims

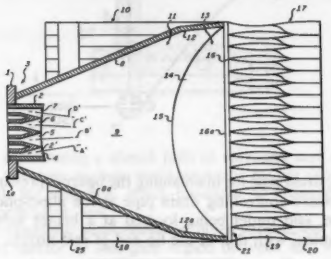
1. Apparatus having focal properties for the collimation and transfer of high frequency electromagnetic energy comprising:

spaced electrically conducting planar broad wall means forming symmetric truncated triangular energy propagation means having first and second opposed energy exchanging port means and characterized by an axis of mirror symmetry,

cylindric dielectric lens means adjacent said first port means disposed within said energy propagation means,

said cylindric dielectric lens means having a substantially planar surface at said first port means,

said cylindric dielectric lens means further having a convex substantially hyperbolic surface symmetrically disposed within said energy propagation means,



first plural wave guide coupling means at said first port means in energy exchanging relation with said planar surface of said cylindric dielectric lens means, and

second plural wave guide coupling means at said second port means in energy exchanging relation therewith.

4,187,508

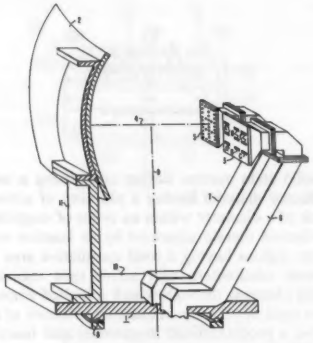
REFLECTOR ANTENNA WITH PLURAL FEEDS AT FOCAL ZONE

Gary E. Evans, Baltimore, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 722,260, Sep. 10, 1976, abandoned. This application Nov. 1, 1978, Ser. No. 956,779

Int. Cl.[2] H01Q *19/14*

U.S. Cl. 343—770 **4 Claims**



1. An antenna assembly comprising,

a reflector having a surface curvature to concentrate microwave energy at a localized region intermediate its ends thereof to provide a focal axis intermediate its ends for forming a beam of electromagnetic wave energy thereon,

a first feed means positioned in direct alignment with said focal axis, and

second feed means for such energy positioned at one side of said focal axis,

said second feed means including an array of horizontal rows of feed elements positioned at said one side to illuminate a common horizontal segment of said reflector on the focal axis and at opposite sides of said focal axis,

at least certain of said rows of feed elements being horizontally spaced apart selected unequal distances from each other at said one side of the focal axis, said distance being selected such that the summation vectors of the beam reflected from said one side of said focal axis point in a different direction than the summation vectors of the beam reflected from the opposite side of said focal axis and the summation vectors of both said beams point in different directions than the beam reflected from the focal axis for reducing sidelobe content of such beam.

4,187,509

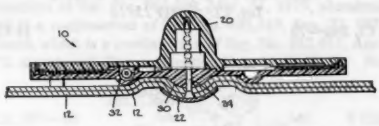
WAFER AND FASTENER FOR USE IN ELECTRONIC THEFT DETECTION SYSTEM

Arnold Weiner, Brooklyn, N.Y., assignor to Knogo Corporation, Hicksville, N.Y.

Filed Jun. 20, 1977, Ser. No. 808,362

Int. Cl.[2] G08B *13/00*; H01Q *1/36*

U.S. Cl. 343—873 **12 Claims**



1. A target wafer for use in an electronic theft detection system, said wafer comprising upper and lower members which are generally flat and coextensive and which are laminated to each other, one of said members having a continuous, spiral shaped groove formed in the surface thereof facing the other member, an elongated electrical conductor lying in said groove, a capacitor also contained between said members, said capacitor being electrically connected to said electrical conductor near each end thereof to form a resonant electrical circuit.

4,187,510

DEVICE FOR RECORDING VEHICLE SPEEDS

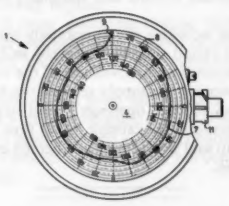
Berthold Dold, Schramberg, Fed. Rep. of Germany, assignor to Kienzle Apparate GmbH, Villingen, Fed. Rep. of Germany

Filed Apr. 13, 1978, Ser. No. 896,230

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1977, 2718681

Int. Cl.[2] G07C *5/12*

U.S. Cl. 346—21 **6 Claims**



1. Recording device for vehicles comprising a housing, a lid removably mounted on said housing, said lid including a ring forming the outer circumferential periphery of said lid and a cover part extending across said ring, said ring shaped to interengage with said housing so that said ring can be releasably disengaged from said housing, a record carrier located in said housing under said lid, said record carrier having an erasable recording layer thereon formed of a suitable paste for recording speeds of a vehicle, means within said housing for driving said record carrier in accordance with at least one of time and distance traveled, said record carrier is removably mounted in said housing and is arranged to prevent tampering with the recording layer, means on said ring and said record carrier for interconnecting said lid and record carrier as an

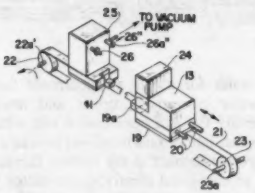
inseparable unit so that both parts can be removed as a unit from said housing of the recording device, said unit having a first outer surface and a second outer surface each extending transversely of the axis of said ring with said cover part forming the first outer surface and said record carrier forming the second outer surface, said record carrier having a surface facing toward the cover part of said lid and facing in the opposite direction from the second outer surface, and said recording layer formed on the surface of said record carrier facing said cover part so that the recording layer is located between the lid and the record carrier.

4,187,511

METHOD AND APPARATUS FOR FILLING THE MOVABLE RESERVOIR OF AN INKJET PRINTER

Prentice Robinson, Pelham, N.H., assignor to Centronics Data Computer Corp., Hudson, N.H.

Filed Mar. 20, 1978, Ser. No. 890,620
Int. Cl.[2] G01D *15/18*
U.S. Cl. 346—75 **14 Claims**



1. Means for providing ink for an inkjet printer, said printer including an inkjet print head and carriage means for supporting the print head;

means for moving said carriage means between left and right hand margins of the printer so as to effect printing of lines of characters of other graphic patterns on said web;

a small size ink reservoir mounted upon said carriage means;

a large size ink supply reservoir mounted in a stationary fashion upon said printer and adjacent to one of the aforesaid margins;

means for sensing an ink low condition in said small reservoir for generating an ink low signal;

means responsive to said ink low signal for moving said carriage means toward said stationary ink supply reservoir;

nozzle means including means normally biasing said nozzle means to a closed condition whereby said nozzle means is moved responsive to movement of the carriage adjacent to said stationary ink supply reservoir to become unsealed and to span between openings in said large and small ink supply reservoirs for causing ink to flow from said large reservoir to said small reservoir thereby enabling printing to continue.

4,187,512

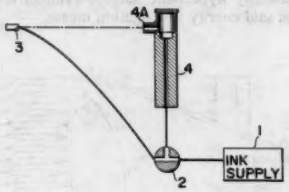
INK LIQUID SUPPLY SYSTEM FOR AN INK JET SYSTEM PRINTER

Shoichi Matsunaga; Fumio Siozaki, both of Yamatokoriyama, and Masahiko Aiba, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 21, 1978, Ser. No. 917,591
Claims priority, application Japan, Jun. 27, 1977, 52-76754
Int. Cl.[2] G01D *15/16, 15/18*
U.S. Cl. 346—140 R **5 Claims**

1. An ink liquid supply system for an ink jet system printer comprising an ink liquid supply source for supplying ink liquid to a nozzle under a predetermined pressure, an ink liquid drain system for returning the ink liquid from said nozzle, and a valve means for selectively connecting said nozzle with said ink liquid supply source and with said ink liquid drain system, said ink liquid drain system comprising:

a pressure controlling drain pipe connected to said selection valve means; and an outlet formed in the pressure controlling drain pipe for maintaining the internal pressure of said pressure controlling drain pipe at the atmospheric pressure, said outlet being located at a height substantially identical with that of the tip end of said nozzle.

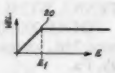


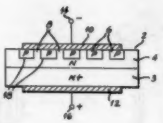
4,187,513

SOLID STATE CURRENT LIMITER

Gordon B. Spellman, Mequon, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Filed Nov. 30, 1977, Ser. No. 855,933
Int. Cl.[2] H01L *47/00*
U.S. Cl. 357—1 **14 Claims**





1. A solid state current limiter comprising a substrate of semiconductor material having a plurality of active spot regions each of a diameter within an order of magnitude of 100 microns formed therein separated by an inactive region, said active spot regions having a total cumulative area of at least 0.002 square centimeters, said active spot regions forming conduction channels through which a limited amount of current flows upon application across said substrate of an electric field above a predetermined magnitude, said inactive region serving a block current flow therethrough and to act as a heat sink around each of said active spot regions.

4,187,514

JUNCTION TYPE FIELD EFFECT TRANSISTOR

Yutaka Tomisawa, Yokohama, and Tatsuro Mitani, Kawasaki, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

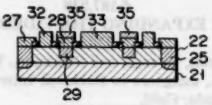
Filed Nov. 4, 1977, Ser. No. 848,569
Claims priority, application Japan, Nov. 9, 1976, 51-133724
Int. Cl.[2] H01L *29/80*
U.S. Cl. 357—22 **14 Claims**

1. A junction type field effect transistor comprising:

a semiconductor substrate including a semiconductor layer of one conductivity type having an exposed major surface,

said substrate formed on a semiconductor body of opposite conductivity type constituting a lower gate region;

semiconductor regions formed in said semiconductor layer and exposed on said major surface thereof including an exposed source region of said one conductivity type, an exposed gate region of said opposite conductivity type, an exposed drain region of said one conductivity type, an exposed isolation region of said opposite conductivity



type constituting a closed path to surround said source, gate, and drain regions; said gate region having a sufficient length for said field effect transistor to attain pentode characteristics; and

a polycrystalline semiconductor layer formed on the exposed surface of said gate region between said exposed drain and isolation regions, said polycrystalline semiconductor layer containing an impurity of said opposite conductivity type.

4,187,515

SEMICONDUCTOR CONTROLLED RECTIFIER

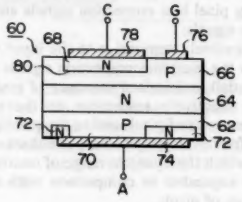
Tetsuo Machii, Tokyo, and Shuji Sugioka, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

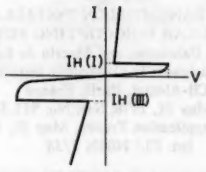
Continuation-in-part of Ser. No. 770,220, Feb. 18, 1977 and Ser. No. 601,184, Aug. 1, 1975, both abandoned, said Ser. No. 770,220 is a continuation-in-part of said Ser. No. 601,184. This application Jul. 14, 1978, Ser. No. 924,707

Claims priority, application Japan, Aug. 15, 1974, 49-93750

Int. Cl.[2] H01L *29/747*

U.S. Cl. 357—39 **4 Claims**





1. A semiconductor controlled rectifier of an asymmetrical construction which, only when supplied with a reverse surge voltage, is turned ON in the reverse direction comprising a semiconductor body having three contiguous regions forming an inner region of one conductivity type and two outer regions of the opposite conductivity type, a first external region of the one conductivity type provided adjacent a first one of said outer regions, a second external region of the one conductivity type provided adjacent a second one of said outer regions and partially overlapping said first external region, said external regions being positioned in such a manner that a portion of each said outer regions is exposed, a cathode electrode formed on only said first external region, an anode electrode formed on said second external region and said exposed portion of the said second outer region, and a gate electrode in conductive contact with said exposed portion of first outer region alone, said cathode electrode and said second external region overlapping each other such that the overlapped area of the second external region is within a range of less than one half the area of the cathode electrode.

4,187,516

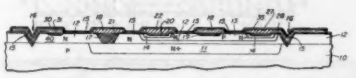
SEMICONDUCTOR INTEGRATED CIRCUITS

Wilhelm H. Legat, Wilmington, Mass.; Keith G. Taft, Ben Lomond, Calif., and Karl H. Tiefert, Los Altos, Calif., assignors to Raytheon Company, Lexington, Mass.

Division of Ser. No. 719,201, Aug. 30, 1976, which is a continuation of Ser. No. 563,429, Mar. 31, 1975, abandoned, which is a continuation of Ser. No. 401,319, Sep. 27, 1973, abandoned, which is a continuation of Ser. No. 242,457, Apr. 10, 1972, abandoned. This application Sep. 13, 1977, Ser. No. 832,846

Int. Cl.[2] H01L *29/04*

U.S. Cl. 357—60 **8 Claims**



1. In combination:

a semiconductor substrate of a first conductivity type having a plurality of high conductivity regions of a second conductivity type diffused therein;

a plurality of active semiconductor elements in an epitaxial layer of monocrystalline semiconductor material having a <100> crystallographic surface plane and supported by said substrate;

each of said elements comprising a plurality of emitter regions formed in a common base region and having separate emitter contacts formed therewith and electrically isolated from each other;

said elements having unidirectionally conductive collector junctions comprising regions of said layer contacting said high conductivity regions;

portions of said layer extending beyond said highconductivity regions and providing regions of substantial resistance directly connected in said collector junction regions; and

isolation regions etched from said <100> surface plane along <101> crystallographic surface planes completely through said layer between at least portions of said semiconductor elements and bounding portions of said resistance regions.

4,187,517

SEMICONDUCTOR COMPONENT

Karl Platzöder, Haimhausen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jan. 13, 1978, Ser. No. 869,247

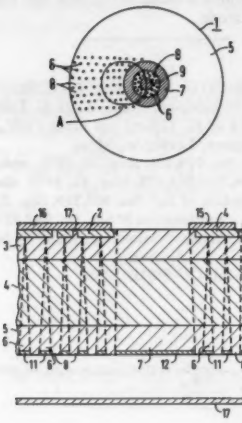
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1977, 2710701

Int. Cl.[2] H01L *29/167*

U.S. Cl. 357—64 **3 Claims**

1. A semiconductor component comprising a semiconductor body having at least two zones of alternately opposite conductivity type, an anode electrode, an anode connected to said anode electrode along the entire surface of said body, a cath-

ode, said body including recombination centers therein and at least one layer for gettering the recombination centers upon said cathode, said body including a recombination center characteristic in which there is a drop in the concentration of recombination centers from the anode side and cathode side toward a central zone, said central zone being divided, at least on the anode side, into zone elements exhibiting differing concentrations of recombination centers, the ratio of the zone



elements being set such that in the central zone the anode side mean value of the concentration of recombination centers is higher than the cathode side mean value of the concentration of recombination centers, said central zone including a first portion which is divided into said zone elements and a remainder portion which possesses a concentration of recombination centers which is lower than the concentration mean value determined by the division of said first portion into said zone elements.

4,187,518

TIMING DEVICE

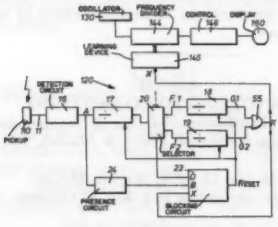
Jean-Claude Martin, Neuchâtel, and Jean F. Perotto, Hauterive, both of Switzerland, assignors to Centre Electronique Horloger SA, Neuchâtel, Switzerland

Filed Jan. 23, 1978, Ser. No. 871,541

Claims priority, application Switzerland, Feb. 21, 1977, 2140/77

Int. Cl.² G04B *27/00*; G04C *9/00*

U.S. Cl. 358—93 **17 Claims**



1. A timing device comprising an oscillator forming a time base, a time display device and a control device intermediate between the oscillator and the display for formatting display signals from said time base, characterized in that it comprises at least one pickup responsive to low-frequency pulses radiated by a television receiver and a treatment circuit for treating said pulses to extract control information therefrom, said treatment circuit having one input connected to the pickup and one output connected to a means for regulating the control device, said means for regulating being responsive to said treatment circuit to produce in said control device at least one of the operations of rate regulation and resetting.

4,187,519

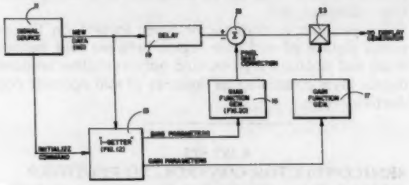
SYSTEM FOR EXPANDING THE VIDEO CONTRAST OF AN IMAGE

Visvaldis A. Vitols, Orange, and Stanley A. White, Santa Ana, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 17, 1978, Ser. No. 934,657

Int. Cl.² H04N *5/14*

U.S. Cl. 358—169 **8 Claims**



1. A system comprising:

non-multiplicative first means responsive to an input sequence of pixels representative of an image for digitally developing bias parameters and gain parameters; and

second means responsive to the input sequence of pixels and to the bias and gain parameters for substantially increasing the dynamic range of the input sequence of pixels, said second means comprising:

first and second function generators respectively responsive to the bias and gain parameters for respectively developing pixel bias correction signals and pixel gain correction signals;

third means selectively responsive to the input sequence of pixels and to the pixel bias correction signals for producing a substantially minimized sequence of pixels; and

fourth means selectively responsive to the substantially minimized sequence of pixels and to the pixel gain correction signals for developing an output enhanced sequence of pixels in which the dynamic range of contrast has been substantially expended in comparison with that of the input sequence of pixels.

4,187,520

FACSIMILE TRANSMISSION INSTALLATION IN PARTICULAR FOR COPYING FORMS

Michel Beduchaud, Palaiseau, and Martin de Loye, Versailles, both of France, assignors to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed May 31, 1978, Ser. No. 911,244

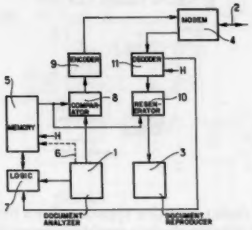
Claims priority, application France, May 31, 1977, 77 16564

Int. Cl.² H04N *1/38*

U.S. Cl. 358—257 **7 Claims**

1. A facsimile transmission installation for transmitting documents which include a portion which is common to a plurality of transmissions and a portion which may vary from transmission to transmission, such documents being referred to as forms; the installation comprising a transmitter terminal including a document analyzer together with means for generating a facsimile signal therefrom, a receiver terminal including means for receiving the facsimile signal together with a document reproducer responsive thereto, and means for conveying the facsimile signal from the transmitter terminal to the receiver terminal wherein each terminal includes a memory for

recording the portions of documents which are common to a plurality of transmissions, the recorded portions of documents being referred to as "blank forms", means for selecting a particular blank form from the memory; wherein the transmitter terminal includes a comparator connected to the memory and to the analyzer to receive respectively a memorized signal and an analysis signal therefrom and to generate in response thereto a useful signal representative of the difference between the completed form being analyzed and the memorized blank



form, and a date compression encoder connected to receive the useful signal and to generate said facsimile signal; and wherein the receiver terminal includes a decoder-expander to receive the facsimile signal and to restore the useful signal therefrom, and a generator connected to said decoder-expander and to the receiver memory and to receive respectively the useful and the memorized signal therefrom and to generate in response thereto a restored analysis signal which represents the contents of the completed form and to apply the restored analysis signal to the document reproducer.

4,187,521

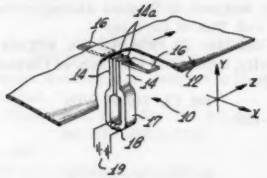
DC ERASE HEAD

Gerhard Rotter, Mission Viejo, Calif., and Klaus D. Schomann, Frankfurt, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Rheinland-Pfalz, Fed. Rep. of Germany

Filed May 4, 1978, Ser. No. 902,842

Int. Cl.[2] G11B *5/02, 5/47*

U.S. Cl. 360—118 **5 Claims**



1. An erase head for erasing recorded material from single tracks of a multi-track magnetic recording tape, said erase head comprising:

a pair of pole pieces having faces locatable in an operative relationship with respect to a moving magnetic recording tape, said faces being in a generally parallel relationship spaced across the width of the tape to provide a magnetic field directed primarily perpendicular to the direction of tape movement;

magnetic circuit means providing a low reluctance path between said pole pieces;

a source of constant magnetomotive force applied to said magnetic circuit means, to provide an unvarying magnetic field between said pole pieces; and

magnetic shielding means spaced outwardly from said pole pieces in a substantially coplanar relationship with said faces, whereby the resultant magnetic field strength in a plane perpendicular to the direction of movement of the tape is substantially uniform in a region inward of said shielding means but is minimized outside the region.

4,187,522

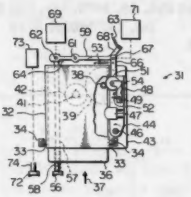
MAGNETIC TAPE PLAYER COMPRISING ELECTROMAGNETIC LATCH DEVICE

Itsuki Ban, Tokyo, and Hidenori Kanno, Funabashi, both of Japan, assignors to Secoh Giken Inc., Tokyo, Japan

Filed Jul. 12, 1978, Ser. No. 923,830

Int. Cl.[2] G11B *19/02, 15/02*

U.S. Cl. 360—137 **14 Claims**



1. An apparatus for playing a magnetic tape comprising:

sound reproduction means operatively engageable with the tape;

tape drive means;

a movable member for controlling the tape drive means to drive the tape at a normal speed when in a released position and at a fast speed when in a depressed position;

a magnet;

a ferromagnetic lever pivotally connected to the movable member and being engageable with the magnet when the movable member is in the depressed position, the lever being configured to provide a mechanical advantage to the magnet for holding the movable member in the depressed position; and

sensor means operatively connected to the sound reproduction means for sensing a blank area on the tape and removing a force of the magnet from the lever for releasing the movable member in response thereto.

4,187,523

DETECTING A SHORT CIRCUIT FAULT IN A DYNAMO ELECTRIC MACHINE

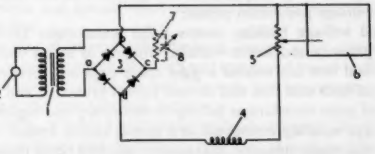
George W. Gray, Sheffield, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Aug. 21, 1978, Ser. No. 934,742

Claims priority, application United Kingdom, Aug. 26, 1977, 35907/77

Int. Cl.[2] H02H *7/08*

U.S. Cl. 361—30 **8 Claims**



1. Apparatus for operating a dynamo-electric machine which is provided with a protective circuit arrangement

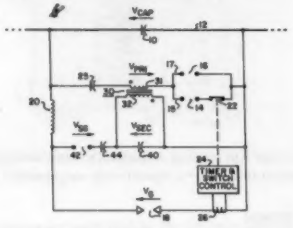
whereby the machine is caused to be switched off if a short circuit current flowing in the machine exceeds a predetermined level, including a voltage transformer and a current transformer, means for deriving a d.c. voltage proportional to the current flowing in the machine, the voltage transformer being connected across the machine supply and the current transformer having its input connected in the current supply to the machine, the protective circuit being arranged to receive current during that period only of a cycle when the outputs from the current and voltage transformers are in phase.

4,187,524

SERIES CAPACITOR PROTECTION EQUPMENT WITH EXTENDED RANGE DUAL SPARKOVER FEATURE

Charles A. Peterson, Van Buren Township, County of Monroe, Ind., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 10, 1978, Ser. No. 876,819
Int. Cl.[2] H02H *7/16*
U.S. Cl. 361—16 **2 Claims**



1. Series capacitor equipment comprising:

a main capacitor connected in series in an alternating current transmission line;

a first circuit branch connected across said main capacitor and including a first trigger spark gap having a first overvoltage protection level;

a second circuit branch connected across said main capacitor and including a second trigger spark gap having a second overvoltage protection level higher than said first protection level;

a third circuit branch connected across said main capacitor and including a main spark gap;

means for disabling said first circuit branch upon the occurrence of a sparkover of said main spark gap and for restoring said first circuit branch to its original operating condition at a predetermined time after it is disabled;

voltage buildup means for ensuring rapid operation of said second trigger spark gap and said main spark gap upon initial operation of said first trigger spark gap, said voltage buildup means comprising a pulse transformer with a primary winding connected in series with said first trigger spark gap across said main spark gap, and with a secondary winding operatively connected to apply a voltage pulse of a magnitude to said main spark gap causing its operation quickly after initial operation of said first overvoltage protection means;

said voltage buildup means pulse transformer having its primary and lower voltage winding in series with both said first and second trigger spark gaps and forming part of both said first and second circuit branches; and

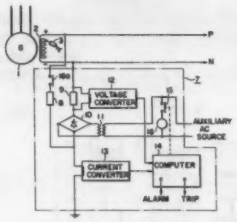
said pulse transformer having its secondary and higher voltage winding connected in a fourth circuit branch across said main capacitor, said second winding being connected to charge capacitive means arranged in series with a slave spark gap which sparks over to cause rapid voltage buildup across said main spark gap.

4,187,525

GROUND FAULT PROTECTIVE APPARATUS OF FIELD WINDINGS

Yukihiro Nagura, Iama, and Yoshihiko Toda, Koganei, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kanagawa, Japan

Filed Feb. 21, 1978, Ser. No. 879,807
Claims priority, application Japan, Feb. 23, 1977, 52-18087
Int. Cl.[2] H02H *7/06*
U.S. Cl. 361—42 **3 Claims**



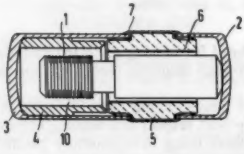
1. Ground fault protective apparatus for a field winding of a synchronous dynamo electric machine comprising a first impedance, a source of direct current, and a current converter which are connected in series between one terminal of said field winding and ground for passing ground fault current of said field winding, a voltage detector for detecting voltage drop across said first impedance, a second impedance connected between the other terminal of said field winding and said current converter through a switch, means responsive to the output of either one of said current converter and said voltage detector for detecting said ground fault, memory means for storing the outputs of said current converter and said voltage detector when said ground fault is detected by said ground fault detecting means, means for closing said switch for passing current from said other terminal of said field winding through said second impedance and said current converter when said ground fault is detected, and means for calculating grounding resistance of said ground fault by using the outputs of said current converter and of said voltage detector before and after closure of said switch thereby judging the magnitude of said ground fault.

4,187,526

GAS-DISCHARGE SURGE ARRESTER WITH CONCENTRIC ELECTRODES

Klaus D. Heinze, and Gerhard Lange, both of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Mar. 20, 1978, Ser. No. 890,634
Claims priority, application Fed. Rep. of Germany, Mar. 30, 1977, 2714122
Int. Cl.[2] H02H *9/06*
U.S. Cl. 361—120 **15 Claims**



1. A gas-discharge surge voltage arrester having two concentrically arranged electrodes separated from each other by a discharge space, a hollow cylindrical insulating body interposed between said electrodes at a position remote from said

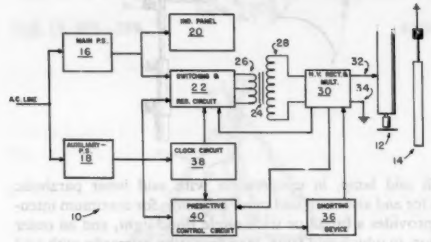
discharge space, and an electrically conductive layer supported on the interior surface of said insulating body, said conductive layer taking the form of a continuous conductive surface coating.

4,187,527

ELECTROSTATIC COATING SYSTEM

Stanley L. Bentley, Indianapolis, Ind., assignor to Ransburg Corporation, Indianapolis, Ind.

Continuation of Ser. No. 712,781, Aug. 9, 1976, Pat. No. 4,075,677. This application Nov. 14, 1977, Ser. No. 851,128
The portion of the term of this patent subsequent to Sep. 21, 1995, has been disclaimed.
Int. Cl.[2] H02H *3/08*
U.S. Cl. 361—235 **20 Claims**



1. A system for controlling voltage across a pair of output terminals including a power supply for generating the voltage, means for coupling the supply to the output terminals, means for sensing the output current flowing between the terminals, means for disrupting the impressed voltage, the disrupting means being coupled to the terminals and having at least one control electrode, a control circuit, first circuit means for coupling the control circuit to the sensing means for providing an output current-related signal at a terminal of the control circuit, the control circuit including sample-and-hold circuit means for sampling a signal related to the output current-related signal during successive sampling intervals and for storing the value of such signal between successive sampling intervals, circuit means for generating an input signal related to the output current-related signal by a predetermined non-negative selectively variable multiplier, and a comparator for comparing the value stored in the sample-and-hold circuit means to the input signal and for generating an output signal when the input signal exceeds the stored value and means for coupling the comparator to the control electrode, the output signal controlling the disrupting means.

4,187,528

POWER CONTROL UNIT

James W. Morriss, Roanoke, Tex., assignor to Hunt Electronics, Inc., Dallas, Tex.

Filed Jul. 1, 1977, Ser. No. 812,416
Int. Cl.[2] H05R *1/04*
U.S. Cl. 361—399 **3 Claims**

1. A control unit enclosure, comprising:

a base sheet shaped to form front, bottom and rear walls of the enclosure, said rear wall having a greater height than the front wall;

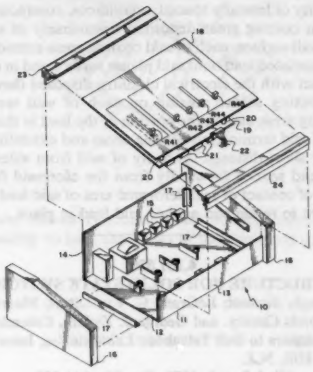
a pair of side walls against opposite edges of said sheet, thereby in contact with opposite edges of said front, bottom and rear walls;

means for connecting each of the side walls with said front, bottom and rear walls;

a cover sheet forming the top wall of the enclosure and having controls mounted thereon for access from outside the enclosure, said sheet having a rear portion near said rear walls;

a circuit board mounted to the underside of the cover sheet and having a first group of electrical components connected with said controls;

a second group of electrical components mounted on the inside of the base sheet, including a plurality of power receptacles mounted to project through one of the walls thereof;



an electrical cable interconnecting said first and second groups of components and having a length and flexibility sufficient for said cover sheet to be optionally installed with the rear portion thereof near the front wall of the enclosure; and

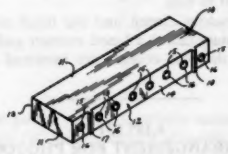
first and second mounting pieces for attaching said cover sheet to the base sheet at top edges thereof.

4,187,529

TERMINAL CONSTRUCTION FOR ELECTRICAL CIRCUIT DEVICE

John E. Bartley, Greenfield; Orville R. Penrod, and Lawrence D. Radosevich, both of Muskego, all of Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.

Continuation of Ser. No. 609,780, Sep. 2, 1975, abandoned. This application Aug. 29, 1977, Ser. No. 828,788
Int. Cl.[2] H05K *1/04*
U.S. Cl. 361—404 **6 Claims**



1. In an electrical circuit device, including a substrate of electrically insulating material having parallel upper and lower planar surfaces, electrical circuit components disposed upon at least one of said planar surfaces, a pair of end surfaces in spaced relationship; and spaced apart parallel front and rear sidewall surfaces and:

a plurality of transversely disposed, spaced apart openings lying in a plane parallel with said upper and lower surfaces and extending through said substrate and intersecting said front and rear sidewall surfaces;

a plurality of spaced apart terminal leads disposed in respective ones of said openings, each lead having an internal and external portion, the external portions of each of said leads projecting from said front sidewall surface, the internal portions of each of said leads being disposed

inwardly of a respective one of said transverse openings, and including a deformed area having a lateral dimension sufficient to provide intimate contact with the defining internal surface of its respective opening, the frontmost point of contact of said deformed area with said internal surface being spaced inwardly from said front sidewall surface;

a plurality of laterally spaced, continuous, conducting termination coating areas deposited transversely of said front sidewall surface, each of said coating areas extending from its associated lead onto said planar surface and in electrical contact with the electrical circuitry disposed thereon; and

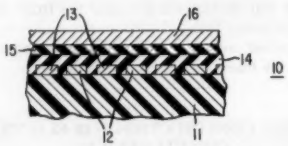
a conducting solder coating on each of said termination coating areas and on the portion of the lead in the proximity of said termination coating areas and extending a relatively short distance inwardly of said front sidewall surface and spaced forwardly from the aforesaid frontmost point of contact of said deformed area of said lead and said surface to retain and anchor said lead in place.

4,187,530

STRUCTURE FOR SOLID STATE SWITCH

Shobha Singh, Summit; LeGrand G. Van Uitert, Morris Township, Morris County, and George J. Zydzik, Columbia, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jun. 1, 1978, Ser. No. 911,338
Int. Cl.[2] H01G *9/00*
U.S. Cl. 361—433 **13 Claims**



1. A solid state electrical switch comprising an input circuit and a readout circuit in which the read out circuit is switched from insulating to conducting state under the influence of an electric field set up by the input circuit by injecting suitable positive ions into an electrochromic material and switching from conducting to insulating state by removing the positive ions from the electrochromic material by reversing the electric field characterized in that

(a) both the readout circuit and the input circuit have a common contact called a based contact and the readout contact and the base contact are mounted on the same plane.

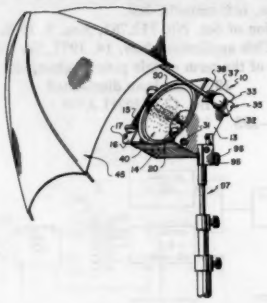
4,187,531

LIGHTING ARRANGEMENT FOR PHOTOGRAPHIC WORK INCLUDING COMBINED SPOT AND FLOOD LIGHT LUMINAIRE

Ross Lowell, P.O. Box 114, Lincolndale, N.Y. 10540, and Marvin H. Seligman, 1203 River Rd., Edgewater, N.J. 07020

Filed Apr. 25, 1978, Ser. No. 899,854
Int. Cl.[2] G03B *15/02*
U.S. Cl. 362—17 **12 Claims**

1. A combined spot and flood light luminaire, for photographic work, arranged to be either held in one hand or mounted on a suitable support and to have photographic accessories mounted thereon, said luminaire comprising, in combination, a casing; a hand grip adjustably secured to said casing whereby said casing can be held in one hand of a user; a shaft rotatably mounted in said casing and projecting outwardly thereof; a handle secured to the projecting end of said shaft adjacent said hand grip for operation by the same hand gripping said hand grip; a lamp socket mounted on said shaft intermediate its ends; a lamp mounted upright in said socket; a reflector assembly mounted in said casing and including a small diameter inner parabolic reflector, a large diameter outer parabolic reflector coaxial with said inner reflector, and a transition zone interconnecting said reflectors; said reflector assembly having a relatively elongated slot therein receiving said lamp socket for swinging of said upright lamp, about the axis of said shaft, by operation of said handle, between an inner position, in



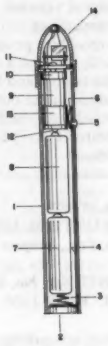
which said lamp, in cooperation with said inner parabolic reflector and also with said outer reflector, for maximum intensity, provides a broad or wide angle flood light, and an outer position, in which said lamp, in cooperation primarily with said outer reflector, provides a concentrated spot light; and mounting means on said casing for mounting said luminaire on a supporting post and for mounting of photographic accessories on said luminaire.

4,187,532

ELECTRONIC CANDLE

Vernon H. Naffier, 899 Laurel St., Dubuque, Iowa 52001

Filed Jun. 22, 1978, Ser. No. 918,068
Int. Cl.[2] F21L *7/00*
U.S. Cl. 362—186 **4 Claims**



1. An improved simulated candle using an electric lamp, said device comprising an elongated structure housing a direct current electrical energy source, a light generating element energized by said electrical energy source, disposed at top end of said elongated structure; a first means located adjacent to said light-generating element for allowing said light-generating element to be energized by said electrical energy source when said light-generating element is momentarily brought into close proximity with an external radiant means, said light-generating element remaining energized after said external radiant means is withdrawn; a second means located adjacent to said light-generating element for de-energizing said light-

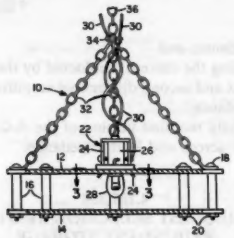
generating element by means of air movement directed toward said second means, said second means cooperating with said first means in such manner that said first means remains continuously operable; and a third means for disposing said first two means in the candle structure in said manner as to afford first two said means protection from damage in ordinary usage without hampering easy accessibility to said electrical energy source and said light-generating element for removal and replacement thereof.

4,187,533

SUBMERSIBLE FISHING LAMP ASSEMBLY

William C. Hampton, 4007 Fern Valley Rd., Louisville, Ky. 40219

Filed Feb. 6, 1978, Ser. No. 875,138
Int. Cl.[2] A01K *97/00, 85/01;* **F21L** *5/00, 15/02;* **F21V** *1/22, 1/24, 17/06*
U.S. Cl. 362—257 **4 Claims**



1. A submersible fishing lamp assembly adapted to directly illuminate surrounding water radially and horizontally outward from said assembly in a relatively narrow layer consisting essentially of

a pair of spaced opaque generally circular plates, one such plate having a hole through the center thereof through which an illuminating means can project:

means securing said plates parallel to and in registry with one another such that the diameter of said plates is at least four times greater than the distance between them, said securing means including fasteners projecting through said plates and plate spacers;

illuminating means disposed between said plates for illuminating water into which said assembly is immersed, said illuminating means comprising a standard light bulb projecting through said hole in said one plate and a light bulb socket; and suspending means connected approximately equidistant around the periphery of said one plate and secured together at a vertex point above said one plate.

4,187,534

UNIVERSAL LENS MOUNTING FOR SELECTIVE SPOTLIGHT BEAM SPREAD

Clyde L. Tichenor, Van Nuys, and Craig LeVasseur, Calabasas, both of Calif., assignors to Berkey-Colortran, Inc., Burbank, Calif.

Continuation of Ser. No. 739,694, Nov. 8, 1976, abandoned. This application Nov. 8, 1978, Ser. No. 958,610
Int. Cl.[2] F21Y *13/04*
U.S. Cl. 362—268 **10 Claims**

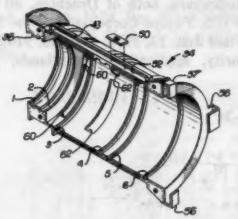
1. In a stage lighting luminaire:

(a) a generally cylindrical lens housing having a small diameter rear end and a large diameter front end;

(b) said housing comprising two complementary halves separable along a longitudinal parting plane;

(c) said housing having a plurality of internal grooves in its large diameter end and a plurality of internal grooves in its small diameter end; said grooves being axially spaced from each other along the length of said housing;

(d) a set of lenses, including small diameter and large diameter lenses and selected for accommodation in said grooves for providing by optical combinations a beam of desired angular spread; and



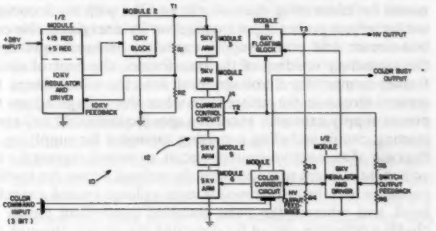
(e) means releasably securing said housing halves together releasably to lock the lenses in their selected grooves.

4,187,535

VOLTAGE POWER SUPPLY

Patrick A. Wigley; Edwin L. Dana, both of Sunnyvale, and Alfred Pletz, Jr., Milpitas, all of Calif., assignors to CPS, Inc., Sunnyvale, Calif.

Filed Mar. 31, 1978, Ser. No. 892,132
Int. Cl.[2] H02M *3/335*
U.S. Cl. 363—16 **29 Claims**



1. A voltage power supply especially suitable for providing a relatively high DC voltage output of rapidly changing amplitude, said power supply comprising:

(a) inverter means adapted for connection to a fixed relatively low amplitude DC voltage input for producing an AC voltage output in response thereto;

(b) converter means connected with said inverter means and responsive to said AC voltage output for producing at its output a DC drive voltage having a fixed amplitude substantially higher than said DC voltage input;

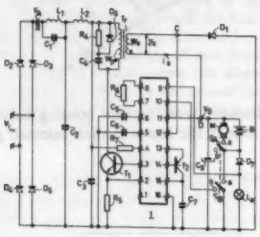
(c) voltage varying means including a pull-up and pull-down circuit arrangement connected to the output of said converter means for producing at its output an adjustable DC output voltage having an amplitude not exceeding the amplitude of said drive voltage; and

(d) voltage adjusting means connected to said voltage varying means and adapted for connection to means for producing a coded signal for rapidly changing the amplitude of said adjustable output voltage in response to said coded signal.

4,187,536
DEVICE FOR ENERGIZING A D.C. MOTOR, COMPRISING AN ACCUMULATOR BATTERY

George A. Govaert, Eindhoven; Meinardus A. G. Nijholt, and Lammert Rodenburg, both of Drachten, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 12, 1978, Ser. No. 914,570
Claims priority, application Netherlands, Jun. 13, 1977, 7706447
Int. Cl.[2] H02M 3/335
U.S. Cl. 363—21 14 Claims



1. A device for energizing a d.c. motor comprising a flyback converter having an output circuit to which the motor may be connected, the flyback converter comprising a control circuit, which for the greater part is designed as an integrated circuit, for generating control pulses having a fixed frequency of the order of tens of kHz and with a controlled pulse duration for controlling a switching element which is connected in series with a primary winding of a transformer in the flyback converter, the control circuit including means for controlling the pulse duration of the control pulses depending on the output voltage and the current through the primary winding of the transformer, a rechargeable accumulator battery connected in series with a secondary winding of said transformer, switching means for connecting the motor in parallel with the accumulator battery, a power-supply capacitor for energizing the control-circuit, said power-supply capacitor being charged from the secondary winding of the transformer, the control circuit further comprising a voltage-level detector which keeps the control circuit in the active state when the voltage across the power-supply capacitor exceeds a specific threshold voltage, a starting circuit including a starting capacitor for supplying, in the case of an inactive control circuit, a control current for the switching element provided that the voltage across the starting capacitor and the instantaneous input voltage exceed a specific level, and wherein the pulse duration controlling means includes a detection circuit for detecting the current through the primary winding of the transformer and also the instantaneous value of the input voltage so that the pulse duration of the control pulses is also determined by the instantaneous value of the input voltage.

4,187,537
FULL-WAVE RECTIFIER

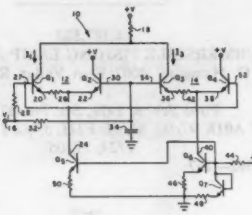
Richard Avicola, Addison, and George J. Tzakis, Chicago, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed Dec. 21, 1978, Ser. No. 972,193
Int. Cl.[2] H02M 7/217
U.S. Cl. 363—127 9 Claims

1. A full-wave rectifier, comprising:

first differential amplifier means adapted to receive an A.C. input signal and having first and second amplifiers sharing current from a common current source, said first amplifier having a D.C. operating point substantially offset from that of said second amplifier such that said first amplifier conducts substantially only on positive excursions of the A.C. input signal;

second differential amplifier means adapted to receive the A.C. input signal and having first and second amplifiers sharing current from a common current source, said first amplifier in said second differential amplifier means having a D.C. operating point substantially offset from that of said second amplifier in said second differential amplifier means such that said first amplifier in said second differential amplifier means conducts substantially only on negative excursions of the A.C. input signal;



a load impedance; and

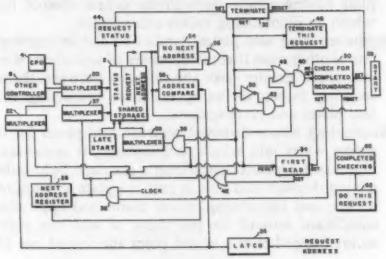
means coupling the current conducted by the first amplifiers of said first and second differential amplifier means to said load impedance,

whereby a fully rectified version of the A.C. input signal is developed across said load impedance.

4,187,538
READ REQUEST SELECTION SYSTEM FOR REDUNDANT STORAGE

Robert H. Douglas, and Thomas L. Phinney, both of Phoenix, Ariz., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 13, 1977, Ser. No. 805,963
Int. Cl.[2] G06F 13/00
U.S. Cl. 364—200 4 Claims



1. In a computer system having redundant address data storage in a plurality of data storage locations, and a shared random access memory, a method of exclusively selecting one of the redundant addresses when the corresponding data is requested by any of one or more central processor units, said method comprising:

storing information in said shared random access memory relative to an initiating data request including the address, the execution status, and the address of the redundant storage of the requested data,

querying said shared random access memory relative to said status, if said request has been executed or is being executed as a result of a previous routine, then terminating the initiating request,

if said request is not being or has not been executed, then querying said random access memory relative to said redundant address,

if said random access memory indicates no redundant address, then initiating a routine to execute the initiating request,

if said random access memory includes a redundant address, then querying said random access memory relative to the execution status of said redundant address,

if said redundant address status is indicated as being completed or in progress, then terminating the initiating request,

and if said redundant address status is not indicated as being completed or in progress, then initiating said routine for executing the initiating request.

4,187,539
PIPELINED DATA PROCESSING SYSTEM WITH CENTRALIZED MICROPROGRAM CONTROL

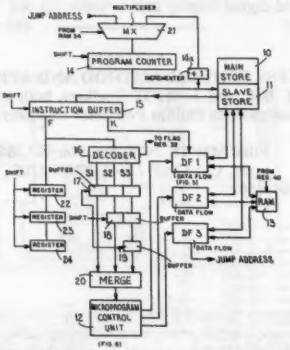
John R. Eaton, Salford, England, assignor to International Computers Limited, London, England

Filed Jul. 28, 1977, Ser. No. 819,868

Claims priority, application United Kingdom, Aug. 17, 1976, 34259/76

Int. Cl.² G06F *9/20, 9/06*

U.S. Cl. 364—200 **1 Claim**



1. A data processing system comprising a plurality n of simultaneously operable data processing stages each of which contains an arithmetic unit for performing arithmetic operations on data in response to control signals, program control means for producing a sequence of control codes, a new control code being produced each time a shift signal is received by the program control means, and a plurality n of buffers connected in series, the first buffer in the series being connected to the output of the program control means, and each buffer being clocked by said shift signal so that when a said shift signal occurs the contents of each buffer is transferred into the next buffer, if any, in the series and the control code currently produced by the program control means is transferred into the first buffer in the series, whereby at any given time the series of buffers contains the latest n control codes produced by the program control means, wherein the improvement comprises

(a) means connected to all the buffers for merging together the current contents of all the buffers to form a single microprogram start address;

(b) a microprogram store containing a plurality of sequences of microinstructions;

(c) microprogram sequencing means, connected to receive the microprogram start address from the merging means, for producing a sequence of microprogram addresses starting at said microprogram start address, and for applying the sequence of microprogram addresses to the microprogram store so as to read out a corresponding sequence of microinstructions therefrom; and

(d) microinstruction decoding means for decoding each microinstruction read out of the store, to produce said control signals which are applied to said n data processing stages, and for producing said shift signal at the end of each sequence of instructions.

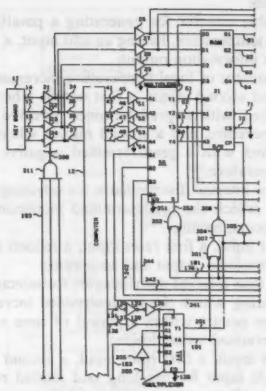
4,187,540
CONTROL PANEL SELF-TEST

Thomas T. Davis, and Marvin C. Burk, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 18, 1978, Ser. No. 870,546

Int. Cl.² G06F *11/06, 3/14, 3/02*

U.S. Cl. 364—200 **14 Claims**



1. Apparatus comprising:

means for supplying a first binary address;

a computer means;

means for transmitting said first binary address to said computer means, said computer means performing a predetermined function in response to said first binary address;

a data display means;

means for transmitting data from said computer means to said data display means; and

means for testing said means for supplying said first binary address and said data display means, said means for testing said means for supplying said first binary address and said data display means including means for bypassing said computer means so as to supply said first binary address to said data display means, said data display means displaying a predetermined response to said first binary address if a malfunction does not occur in said means for supplying said first binary address and said data display means, said data display means displaying a response, other than said predetermined response, to said first binary address if a malfunction does occur in said means for supplying said first binary address or said data display means.

4,187,541
DIGITAL ANALYZER FOR DETERMINING LIQUIDUS TEMPERATURE OF METALS AND ALLOYS

Vladimir I. Skurikhin; Leonid S. Fainzilberg, and Leonid S. Zhitetsky, all of Kiev, U.S.S.R., assignors to Institut Kibernetiki Akademii Nauk Ukrainskoi SSR, Kiev, U.S.S.R.

Filed Jun. 8, 1978, Ser. No. 913,910

Claims priority, application U.S.S.R., Jun. 13, 1977, 2496567

Int. Cl.² G06F *15/20;* G01N *25/02*

U.S. Cl. 364—497 **2 Claims**

1. A digital analyzer for determining the liquidus temperature of metals and alloys, comprising

a converter for converting the actual temperature of metals and alloys to a digital pulse code, having an input, whereto there is applied a signal carrying information on the actual temperature of a metal or alloy being analyzed in the process of cooling, a first output for code pulses corresponding to a positive increment of temperature, and a second output for code pulses corresponding to a negative increment of temperature;

a clock pulse generator having an output;

a synchronization unit for distributing clock and code pulses in time, having

first, second and third inputs, a first output for synchronized code pulses corresponding to a positive increment of temperature, a second output for synchronized code pulses corresponding to a negative increment of temperature, and a third output for synchronized clock pulses;

a reversible counter for generating a parallel code of the actual temperature, having an add input, a subtract input, and an information output;

a discriminator of local temperature increments, having

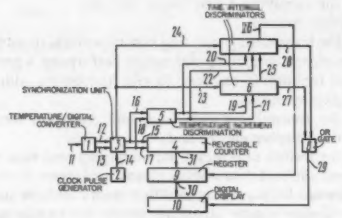
first and second inputs, a first output whereto a signal is applied with a predetermined positive increment of temperature, and a second output whereto a signal is applied with a predetermined negative increment of temperature;

a first time interval discriminator for selecting time intervals during which the predetermined increment of temperature occurs, having

a count input, a first reset input, a second reset input, an intermediate output and an output;

a second time interval discriminator for selecting time intervals during which the predetermined increment of temperature occurs within a period of time exceeding said predetermined value, having

a count input, a first reset input, a second reset input, a disable input for blocking said second reset input, an intermediate output, and an output;



a register for storing the result of the analysis, having

an information input, a control input, and an information output;

an OR gate, having

a first input, a second input and an output;

a digital display unit for displaying the result of the analysis in a digital form, having

an information input, and a control input;

said first input of said synchronization unit, connected to said first output of said converter for converting the actual temperature of metals and alloys to a digital pulse code;

said second input of said synchronization unit, connected to said second output of said converter for converting the actual temperature of metals and alloys to a digital pulse code;

said third input of said synchronization unit, connected to said output of said clock pulse generator;

said first output of said synchronization unit, connected to said add input of said reversible counter and to said first input of said discriminator of local temperature increments;

said second output of said synchronization unit, connected to said subtract input of said reversible counter and to said second input of said discriminator of local temperature increments;

said third output of said synchronization unit, connected to said count input of said first time interval discriminator, and to said count input of said second time interval discriminator;

said first output of said discriminator of local temperature increments, connected to said first reset input of said first time interval discriminator and to said first reset input of said second time interval discriminator;

said second output of said discriminator of local temperature increments, connected to said second reset input of said first time interval discriminator and to said second reset input of said second time interval discriminator;

said intermediate output of said first time interval discriminator, connected to said disable input of said second time interval discriminator;

said output of said first time interval discriminator connected to said first input of said OR gate;

said output of said second time interval discriminator connected to said second input of said OR gate;

said intermediate output of said second time interval discriminator, connected to said control input of said register;

said information input of said register, connected to said information output of said reversible counter;

said information input of said digital display unit, connected to said information output of said register;

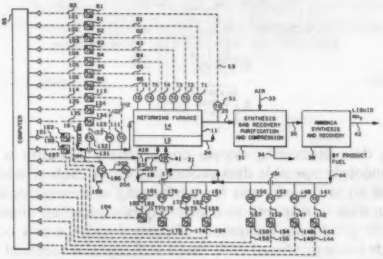
said output of said OR gate, connected to said control input of said digital display unit.

4,187,542

PROCESS CONTROL METHOD AND APPARATUS

Donald H. Ball, and James D. Voelkers, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 18, 1978, Ser. No. 907,386
Int. Cl.[2] G06F *15/46*; F23N *1/00*
U.S. Cl. 364—502 **18 Claims**



1. Apparatus comprising:

a furnace means;

means for supplying a first fuel to said furnace means;

means for supplying a second fuel to said furnace means, said first fuel being different from said second fuel;

means for supplying a feed stream to said furnace means;

means for establishing a first signal representative of the flow rate of said feed stream;

means for establishing a second signal, representative of the predicted heat input to said furnace means required to reform said feed stream in some desired manner, in response to said first signal;

means for establishing a third signal representative of the heat being supplied by said first fuel; means for establishing a fourth signal representative of the heat being supplied by said second fuel;

means for establishing a fifth signal, representative of the total heat being supplied to said furnace means, in response to said third and fourth signals;

means for establishing a sixth signal representative of the measured temperature of the effluent flowing from said furnace means;

means for establishing a seventh signal representative of the desired temperature of said effluent flowing from said furnace means;

means for establishing an eighth signal responsive to the

difference between said sixth signal and said seventh signal;

means for establishing a ninth signal, representative of the actual required heat input to said furnace means, in response to said second signal and said eighth signal;

means for establishing a control signal responsive to the difference between said fifth signal and said ninth signal; and

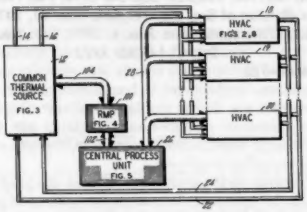
means for manipulating the flow rate of said first fuel and the flow rate of said second fuel in response to said control signal to provide the required heat input to said furnace means.

4,187,543

TEMPERATURE CONTROL OF CHILL WATER AND STEAM IN HEATING, VENTILATION, AIR CONDITIONING (HVAC) SYSTEMS

David M. Healey, Feeding Hills, Mass., and John E. Games, Granby, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 25, 1977, Ser. No. 845,110
Int. Cl.[2] G06F *15/46*; F24F *3/00*
U.S. Cl. 364—505 **11 Claims**



1. Apparatus for controlling the discharge temperature of thermal fluid presented from a common thermal source to one or more HVAC systems in a network, each HVAC controlling the volume of thermal fluid circulating therethrough in dependence on the thermal energy demand from temperature regulated living spaces associated with each by position modulation of an associated HVAC fluid valve apparatus over a total valve position range from a full closed position for a minimum volume to a full open position for maximum volume, the apparatus comprising:

position sensing means, for providing actual valve position signals for the fluid valve apparatus associated with each HVAC system;

temperature sensing means, adapted to be disposed in the common thermal source, for providing an actual discharge temperature signal; and

electronic processing means, responsive to said position sensing means and said temperature sensing means, for providing in response to said actual valve position signals a signal manifestation having a magnitude representative of the highest HVAC system thermal energy demand in the network, said processing means further providing control of the common thermal source to provide modulation of the source discharge temperature in dependence on said signal manifestation magnitude.

4,187,544

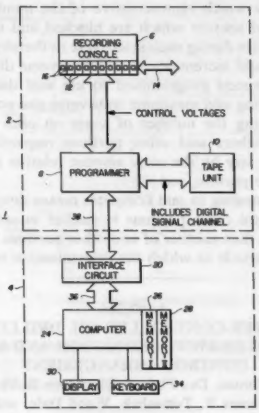
AUTOMATED MIXING SYSTEM WITH DISPLAY/DATA ENTRY SUBSYSTEM

Michael W. Larner, Mill Valley, Calif., assignor to Rubinson & Friends, Inc., San Francisco, Calif.

Filed Jul. 18, 1978, Ser. No. 925,741
Int. Cl.[2] H04R *29/00*
U.S. Cl. 364—514 **31 Claims**

9. Apparatus for an automated mixing-recording system having an automation programmer, a multi-track tape recording unit, and a recording console having a plurality of I/O modules thereon and fader setting means associated with each I/O module, said apparatus comprising:

(a) display means for displaying fader levels corresponding to fader setting means of said console I/O modules and for displaying fader levels previously recorded on a multi-track tape, said automation programmer providing con-



sole fader level data signals from said console and said multi-track tape recording unit; and

(b) interface means connected between said programmer and said display means for interconnecting same;

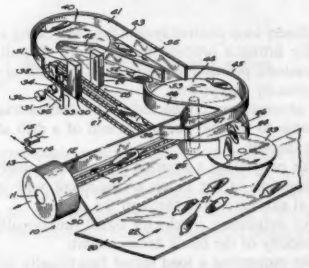
whereby representation of said console and previously recorded data signals may be displayed on said display means.

4,187,545

ARTICLE ORIENTATION DETERMINING APPARATUS

John M. Wallace, Kewaunee, and Gerald A. Pitner, Appleton, both of Wis., assignors to Frank Hamachek Machine Company, Kewaunee, Wis.

Filed Feb. 28, 1978, Ser. No. 882,288
Int. Cl.[2] G01B *11/10*; A01F *11/06*
U.S. Cl. 364—559 **21 Claims**



1. In apparatus for determining the orientation of articles that are being transported in a longitudinal direction and have a maximum size portion and other portions having different sizes measured in a direction transverse to said longitudinal direction on at least one side of said maximum size portion,

means for transporting said articles longitudinally in a predetermined path,

scanning means including a plurality of radiation source means for projecting beams of radiation across said path,

a plurality of radiation detector means disposed to receive radiation projected across said path,

means for turning said radiation sources on and off in sequence to effect a scanning cycle and means for effecting repetitions of the cycle for successive increments of length of an article as it passes between said source and detector means,

means controlled by said detector means to produce successive data words representative of the number of beams from said sources which are blocked and unblocked by said articles during each scan cycle to thereby indicate the sizes of said increments in said transverse direction,

computer means programmed to use said data words for determining said maximum transverse size portion and for determining the number of scans on each side of said portion where said other portions respectively are reduced in size by the same amount relative to said maximum size portion, and

means responding to said computer means determining that one of said other portions is smaller in said transverse direction than another of said other portions by acting on the said article to which the determination relates.

4,187,546

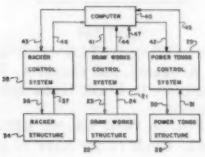
COMPUTER-CONTROLLED OIL DRILLING RIG HAVING DRAWWORKS MOTOR AND BRAKE CONTROL ARRANGEMENT

James P. Heffernan, Des Plaines, Ill.; Loren B. Sheldon, Houston, Tex.; James R. Tomashek, Wood Dale, and Donald H. Ward, Glen Ellyn, both of Ill., assignors to B. J. Hughes Inc., Long Beach, Calif.

Filed Mar. 15, 1977, Ser. No. 777,724

Int. Cl.[2] E21B *19/00*; G06F *15/20*

U.S. Cl. 364—565 **7 Claims**



1. A closed-loop control system for controlling a drawworks motor for lifting a predetermined length of drill string to a predetermined position within an oil derrick at a predetermined velocity comprising:

a block arrangement connected to the drawworks motor and adaptable to support the upper end of a drill string during lifting thereof;

means for outputting a position signal functionally related to the elevation of the block arrangement with respect to a vertical axis extending through the derrick;

means for outputting a velocity signal functionally related to the velocity of the block arrangement;

means for outputting a load signal functionally related to the magnitude by which a weight supported by the block arrangement deviates from a predetermined portion of the weight supported by the block arrangement when the block arrangement is in a substantially static condition;

means for generating an error signal functionally related to the difference between the position signal and a signal representative of the predetermined position to the difference between the velocity signal and a signal representative of the predetermined velocity, and to the load signal; and,

means responsive to the error signal for driving the motor in a manner so as to change the error signal in a direction such as to reduce the block velocity otherwise prevailing.

4,187,547

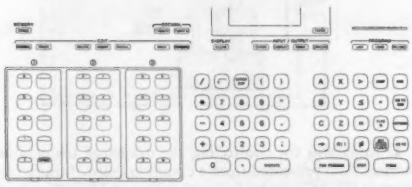
PROGRAMMABLE CALCULATOR INCLUDING MEANS FOR CONTROLLABLY INTRODUCING BLANK LINES ON A PRINTED RECORD DURING PROGRAM EXECUTION

Emil E. Olander, Jr., Fort Collins; Rex L. James, Loveland; Ivar W. Larson, Loveland; Wayne F. Covington, Loveland; Jack M. Walden, Loveland; Robert E. Watson, Loveland; Francis J. Yockey, Loveland; Fred Wenninger, Jr., Loveland, and Homer C. Russell, Berthoud, all of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 510,921, Sep. 30, 1974, Pat. No. 4,028,538, which is a division of Ser. No. 212,581, Dec. 27, 1971, Pat. No. 3,839,630. This application Jun. 1, 1977, Ser. No. 802,322

Int. Cl.[2] G06F *3/12*

U.S. Cl. 364—710 **5 Claims**



1. An electronic calculator comprising:

keyboard input means having a plurality of alphabetic, numeric, and control keys for entering lines of alphameric information, including control commands, into the calculator;

memory means for storing a line of alphameric information entered into the calculator from said keyboard input means;

processing means, coupled to said keyboard input means and memory means, for processing a line of alphameric information entered into the calculator from said keyboard input means and stored in said memory means to perform selected functions; and

line printer means, coupled to said processing means, for printing lines of alphameric information on a record medium;

said control keys including an execute control key for initiating processing by said processing means of a line of alphameric information entered into the calculator from said keyboard input means and a printer control key, operative with selected ones of said plurality of alphabetic and numeric keys, for entering a printer spacing control command, including specification of a number of blank lines, into the calculator;

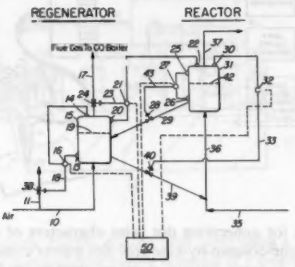
said processing means being responsive to entry from said keyboard input means of a printer spacing control command, including specification of a number of blank lines, followed by actuation of said execute control key, for causing said line printer means to introduce a number of blank lines on the record medium, as specified in the printer spacing control command.

4,187,548

SIMULATION OF CATALYTIC CRACKING PROCESS

Benjamin Gross; Solomon M. Jacob, both of Cherry Hill; Donald M. Nace, Woodbury, all of N.J., and Sterling E. Voltz, Media, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 148,051, May 28, 1971, abandoned.
This application May 23, 1974, Ser. No. 472,525
Int. Cl.[2] G06F *15/32*
U.S. Cl. 364—578 5 Claims



4. Apparatus for predicting the reaction product yields of a catalytic cracking process for the conversion of a stream of hydrocarbons wherein said stream is contacted with an active catalyst in a reactor maintained under catalytic cracking conditions to provide reaction products which are removed from said reactor, the catalyst in said reactor becoming contaminated by the deposition of coke thereon, said apparatus comprising:

means for lumping said hydrocarbons both kinetically and according to boiling range, two of the lumps of said hydrocarbons including: (1) the carbon atoms in aromatic rings and (2) aromatic side chains associated with the aromatic rings,

means for simulating said catalytic cracking process based on invariant simultaneous and consecutive reactions of the lumped hydrocarbons, and

means for producing an output representing the yield of said reactions based upon said model.

4,187,549

DOUBLE PRECISION RESIDUE COMBINERS/CODERS

James W. Bond, and Gary A. Dressel, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 5, 1978, Ser. No. 939,642
Int. Cl.[2] G06F *7/48*
U.S. Cl. 364—746 3 Claims

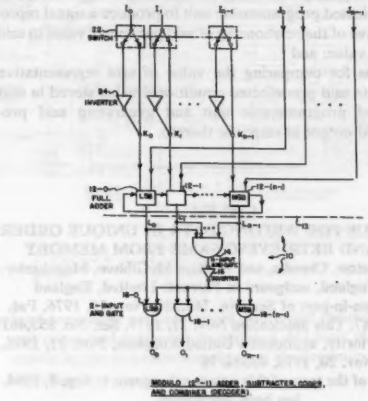
1. Apparatus for the modulo number calculation of input signals in binary form, using residue class arithmetic, comprising:

a plurality n of three-input, two-output, adding means, having one input for receiving a signal $K_0, K_1, \ldots, K_{n-1}$, where K_i=a mod (2^n-1), a second input for receiving a signal, $J_0, J_1, \ldots, J_{n-1}$, where J_i=b (mod 2^n-1), the third input, for receiving an input carry, being circularly connected to one of the outputs, a first output, of an adjacent adding means, for transmitting an output carry to it, the first output of the 0-th adding means being connected to the third input of the 1st adding means, the 1st to the 2nd, etc., through the $(n-1)$st to the 0-th;

an n-input means for adding, whose inputs comprise, and are connected to, the second outputs of the n three-input adding means, for adding the n inputs in an AND manner;

an inverting means, whose input is connected to the output of the n-input adding means, for inverting the signal at its input; and

a plurality of n two-input ANDing means, each having one of its inputs connected to the output of one of the n adding means, the other input being connected to the output of the inverting means, the output signal comprising the sum



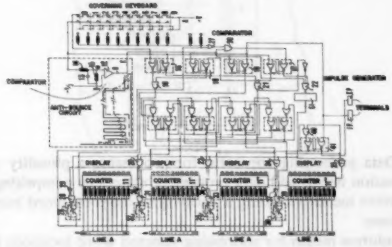
$K_i+J_i=(a+b)$ modulo (2^n-1) of two input signals, K_i=a modulo (2^n-1) and J_i=b modulo (2^n-1), whereby the apparatus serves as an adder.

4,187,550

MULTIPLE PARAMETER PROCESSING AND PROGRAMMING SYSTEM

Jose J. Garcia Ramos, Madrid, Spain, assignor to Investigacion y Desarrollo de Nuevas Technicas para Automatismo, S.A. (I.D.T.A., S.A.), Madrid, Spain

Filed Dec. 17, 1976, Ser. No. 751,373
Claims priority, application Spain, Jun. 22, 1976, 449.123
Int. Cl.[2] G06F *15/46, 3/02*
U.S. Cl. 364—900 29 Claims



1. A programmable multiple parameter process controller comprises a plurality of programmable units, for monitoring the relationship between a pre-selected parameter and a preselected value for that parameter and producing a pre-selected output upon the occurence of the pre-selected condition, comprising:

(a) means for selecting a desired programmable unit from said plurality of programmable units contained in said process controller;

(b) means for generating and storing a desired parameter target value in said selected programmable unit;

(c) means for generating and storing a pre-selected conditional value in said selected programmable unit;

(d) means for generating and storing in said selected programmable unit a signal representative of said pre-selected output;

(e) means for selecting one of said plurality of parameters to be monitored;

(f) means for monitoring the value of said selected parameter and comparing said value to said target value stored in said selected programmable unit to produce a signal representative of the relationship of said parameter value to said target value; and

(g) means for comparing the value of said representative signal to said pre-selected conditional value stored in said selected programmable unit and generating said pre-selected output in response thereto.

4,187,551

APPARATUS FOR WRITING DATA IN UNIQUE ORDER INTO AND RETRIEVING SAME FROM MEMORY

Geoffrey Nutter, Cheadle, and William McGibbon, Manchester, both of England, assignors to Ferranti Limited, England

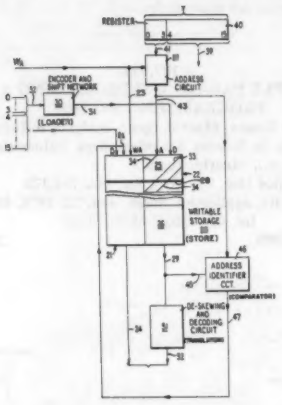
Continuation-in-part of Ser. No. 742,230, Nov. 16, 1976, Pat. No. 4,112,487. This application Nov. 21, 1977, Ser. No. 853,461

Claims priority, application United Kingdom, Nov. 21, 1975, 47988/75; Nov. 20, 1976, 48514/76

The portion of the term of this patent subsequent to Sep. 5, 1994, has been disclaimed.

Int. Cl.² G06F *7/00*

U.S. Cl. 364—900 **18 Claims**



1. Data processing apparatus for processing a plurality of information items, said data processing apparatus comprising:

(a) store means including a plurality of multi-bit word locations;

(b) address means for addressing selected word locations of said store means to enable respectively a reading and writing of information items from and into selected word locations of said store means; and

(c) translating means coupled to said store means for successively imparting to at least a portion of each of said plurality of information items a shift whereby said portion of each of the plurality of information bits is stored into a separate multi-bit word location as determined by said address means in a manner that one of said stored information items has a sequence of bits arranged in an order different from that order of any other stored information item, and for reading out from said store means a single bit of each of said plurality of information items stored in said plurality of corresponding word locations as addressed by said addressing means and for applying a shift to the single bits, the significance of said single bit being the same in each of said stored information items.

4,187,552

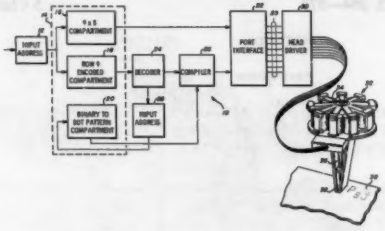
READ ONLY MEMORY CHARACTER GENERATOR SYSTEM

Brian P. Verstegen, Sunnyvale, Calif., assignor to Durango Systems, Inc., Cupertino, Calif.

Filed Sep. 20, 1978, Ser. No. 944,082

Int. Cl.² B41J *3/50*

U.S. Cl. 364—900 **7 Claims**



1. A system for generating dot print characters of a given font within a nine-column-by-nine-row dot matrix comprising:

a read only memory having memory storage devices arranged in rows and columns with a storage capacity per row of memory, the memory having a first memory means, a second memory means and a third memory means, said first memory means having nine memory row locations for each character of the font to be printed, the memory storage devices at each row location for each character being burned in pursuant to the dot matrix pattern for a partial column of dots of that given character, said second memory means having a memory row location for each character of the font to be printed with the memory storage devices at each location being burned in pursuant to the dot matrix pattern for not more than five columns of dots for a row of one of said characters and a binary-coded representation for the dot matrix pattern of the remaining columns of that row for that particular character, and said third memory means having a memory row location for each of said differing binary-coded representations with the storage devices at each location being burned in pursuant to the dot matrix pattern representative of one of said binary-coded representations;

a first input address means for receiving input information representative of a character to be printed and addressing the memory row locations of said first and second memory means corresponding to the particular character to be printed;

a decoder coupled to the second memory means for receiving the output of said second memory means and separating the dot matrix information from the binary-coded information for each character addressed;

a second address means coupled to the decoder for receiving the binary-coded information from the decoder and addressing rows of said third memory means;

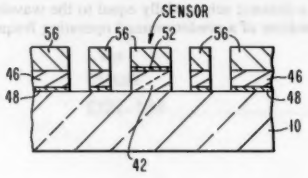
a compiler for receiving the dot matrix information output of the decoder and the dot matrix information output of said third memory means and compiling the dot matrix information for each location in a single row successive column format pursuant to the row dot matrix pattern of the character addressed;

a port interface for receiving successive columns of dot matrix information for the addressed character from said first memory means and said rows of dot matrix information to the addressed character from said compiler, whereby the port interface may be coupled to driver means for activating a matrix print head responsive to successive composite columns of compiled dot information for the character addressed and the print head prints on a print medium in successive columns the dot pattern for the addressed character.

4,187,553
PEDESTAL BUBBLE DOMAIN CHIP AND PROCESSES FOR MAKING SAME

Kie Y. Ahn, Chappaqua; Mitchell S. Cohen, Ossining; John V. Powers, Shenorock, all of N.Y., and Lung-jo Tao, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1977, Ser. No. 863,829
Int. Cl.[2] H01F *10/02*
U.S. Cl. 365—8 25 Claims



1. A magnetic bubble domain chip comprising a plurality of devices for manipulating bubble domains in a magnetic bubble film, comprising:

a magnetic bubble domain sensor for detection of said bubble domains, propagation elements forming shift registers for moving said bubble domains in said magnetic film, write devices for generating bubble domains in said magnetic film, and transfer switches for changing the path of bubble domains in said film,

said shift register propagation elements and transfer switches being comprised of two levels of metallurgy, including a first layer of an electrically conductive, non-magnetic material and a second layer comprising a magnetically soft material, said sensor being comprised of a portion of said magnetically soft material,

an insulating pedestal located under said sensor and localized in the general region of said sensor, said insulating pedestal being surrounded by portions of the conductive material comprising said first layer,

wherein said first and second layers are substantially planar, and parallel to one another and to said bubble domain film and wherein all of the propagation elements forming said registers are in the same plane.

4,187,554
FAULT TOLERANT BUBBLE MEMORY WITH REDUNDANCY USING A STATIONARY REGISTER ON A SINGLE CHIP

Clarence H. Kammann, Minneapolis, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Apr. 24, 1978, Ser. No. 899,606
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—15 5 Claims

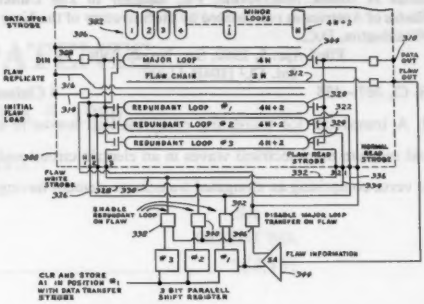
1. A fault tolerant bubble memory device comprising, in a field access type bubble memory employing a major loop-minor loop configuration:

a stationary register having at least as many register positions as the total number of minor loops placed parallel to and adjacent to the major loop in a location to act as a flaw table,

a logic element coupled with said major loop and said register so that the contents of said register and said major loop may be combined whereby defective minor loops may be disregarded and nominal memory capacity retained, said logic element receiving as its input the output of said register and having two outputs,

at least one redundant loop not associated with said major loop,

a first logic gate connected to one of said outputs from said logic element and having a connection with said major loop to disable access to said major loop in response to a flaw indication, and

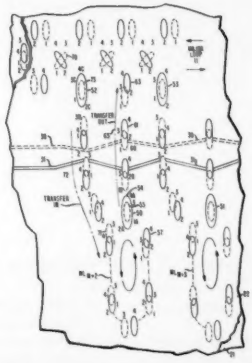


at least one enable gate associated with a said redundant loop and connected to the other output of said logic element to enable access to a redundant loop in the presence of a flaw indication.

4,187,555
CONDUCTOR ACCESS MAGNETIC BUBBLE MEMORY ARRANGEMENT

Andrew H. Bobeck, Chatham, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 23, 1979, Ser. No. 14,606
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—19 8 Claims



7. A magnetic bubble memory comprising a host layer of material in which magnetic bubble can be moved and means for moving magnetic bubbles in the layer, the means comprising first and second layers of electrically conducting material including first and second sets of like apertures respectively for defining at least first and second paths for moving magnetic bubbles therealong in response to a first pulse sequence impressed in the layers, the memory being CHARACTERIZED IN THAT the first and second layers also include relatively small and large apertures respectively, for defining a transfer location the small aperture being positioned to be encompassed by the large aperture, the transfer location being responsive to a second pulse sequence to move a bubble from the second to the first path.

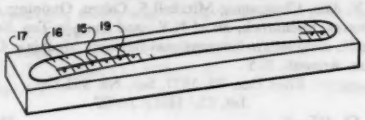
4,187,556

ELECTRO-ACOUSTIC TRANSDUCER WITH LINE FOCUS

Charles H. Jones, Murrysville, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 5, 1960, Ser. No. 20,230
Int. Cl.[2] H04B *11/00*
U.S. Cl. 367—155 4 Claims

1. A transducer for translating compressional waves in a liquid medium into electrical waves in an electric circuit and vice versa comprising an elongated transducer element having a spherically concave active face disposed with its smaller dimension between two circles of latitude spaced apart in a



hemisphere a distance substantially equal to the wavelength in the liquid medium of a predetermined operating frequency.

DESIGN PATENTS

GRANTED FEB. 5, 1980

ERRATA

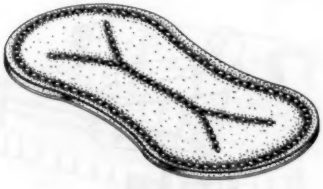
For CLASS	See PATENT NO.
D21–134	254,152

FEBRUARY 5, 1980

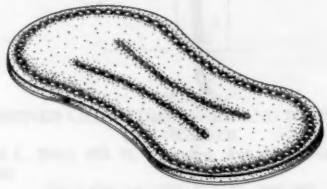
254,096
UNDERGARMENT SHIELD
Shirley T. Richards, P.O. Box 33427, St. Paul, Minn. 55133
Filed Aug. 15, 1977, Ser. No. 824,497
Term of patent 14 years
Int. Cl. D2—*99*; D24—*99*
U.S. Cl. D2—225

254,097
UNDERGARMENT SHIELD
Shirley T. Richards, P.O. Box 33427, St. Paul, Minn. 55133
Filed Aug. 15, 1977, Ser. No. 824,498
Term of patent 14 years
Int. Cl. D2—*99*; D24—*99*
U.S. Cl. D2—225

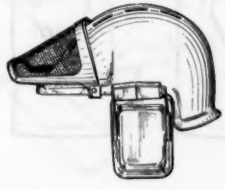
254,098
UNDERGARMENT SHIELD
Shirley T. Richards, P.O. Box 33427, St. Paul, Minn. 55133
Filed Aug. 15, 1977, Ser. No. 824,499
Term of patent 14 years
Int. Cl. D2—*99*; D24—*99*
U.S. Cl. D2—225



254,099
UNDERGARMENT SHIELD
Shirley T. Richards, P.O. Box 33427, Saint Paul, Minn. 55133
Filed Aug. 15, 1977, Ser. No. 824,500
Term of patent 14 years
Int. Cl. D2—*99*; D24—*99*
U.S. Cl. D2—225

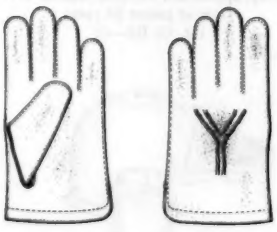


254,100
PROTECTIVE HELMET WITH EAR MUFFS AND FACE PROTECTION
Carl-Arne Breger, Malmo, Sweden, assignor to Sandvik Aktiebolag, Sandviken, Sweden
Filed Aug. 23, 1977, Ser. No. 827,119
Claims priority, application Sweden, Mar. 1, 1977, 77-0470
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—232



254,101
ATHLETIC SOCK
John H. Gilbert, Rte. 1, Box 163A1, Newton, N.C. 28658
Filed Jul. 18, 1977, Ser. No. 816,318
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—330

254,102
GLOVE
Howard Rubin, Weston, Conn., assignor to Kombi, Ltd., Norwalk, Conn.
Filed Apr. 12, 1978, Ser. No. 895,871
Term of patent 14 years
Int. Cl. D2—*06*
U.S. Cl. D2—373

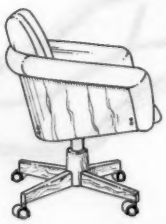


254,103
PAINT SCRAPER HOLDER OR SIMILAR ARTICLE
John Criswell, Rte. 1, Box 60, Corning, Iowa 50841
Filed Apr. 7, 1978, Ser. No. 894,597
Term of patent 14 years
Int. Cl. D2—*99*
U.S. Cl. D2—400

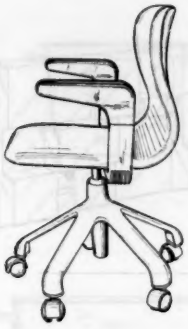
Fig. 1

Fig. 7

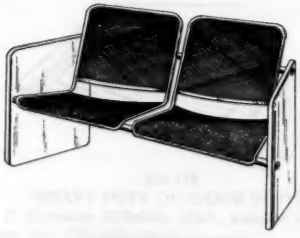
254,104
CHAIR
Robert L. Wilson, Senatobia, Miss., assignor to Chromcraft Corporation, Amsterdam, N.Y.
Filed Aug. 15, 1977, Ser. No. 824,944
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—31



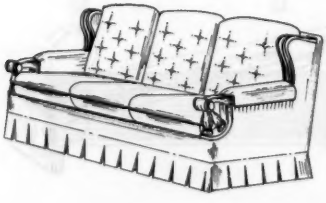
254,105
CHAIR
Isao Hosoe, Milan, Italy, assignor to Sacea S.a.s. di Tirinnanzi Giampietro & Co., Legnano, Italy
Filed Aug. 25, 1977, Ser. No. 827,819
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—31



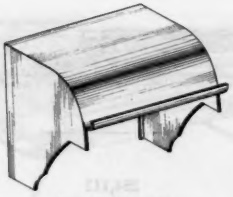
254,106
SEAT
Roland A. Benoit, 89 S. Main St., Danielson, Conn. 06239
Filed May 13, 1977, Ser. No. 796,798
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—59



254,107
SEAT
Lester Beall, High Point, N.C., assignor to Trend Line Furniture Corporation, Amsterdam, N.Y.
Filed Mar. 29, 1977, Ser. No. 782,605
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—62



254,108
TOILET TISSUE COVER
Marlene Y. Chandler, 3174 Forest Manor, Indianapolis, Ind. 46218
Filed Oct. 18, 1978, Ser. No. 952,320
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—86



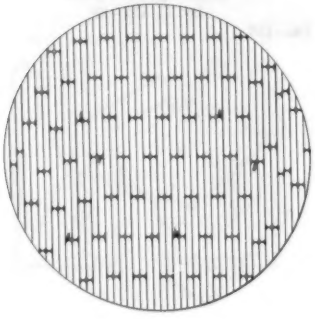
254,109
COMBINED LIQUID DISPENSER AND DISPOSABLE CUP HOLDER
Ronald L. Price, 401 W. Vineyard, Apt. 369, Oxnard, Calif. 93030
Filed Feb. 14, 1977, Ser. No. 768,556
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—91

254,110
SPEAKER STAND
Robert P. Stanley, P.O. Box 29722, Dallas, Tex. 75229
Filed Oct. 25, 1977, Ser. No. 844,699
Term of patent 7 years
Int. Cl. D6—*99*
U.S. Cl. D6—155

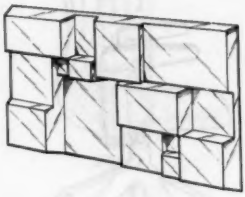
254,111
SET OF COSMETIC SELECTION AND DISPLAY UNITS
Dora Schaefer, New York, N.Y., assignor to Helena Rubinstein, Inc., New York, N.Y.
Filed Oct. 21, 1977, Ser. No. 844,512
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—157

254,112
WORKBENCH
Milton E. Handler, 3330 Old Mill, Northbrook, Ill. 60062, and Richard Sylvan, 2731 Virginia La., Glenview, Ill. 60025
Filed Oct. 5, 1977, Ser. No. 839,511
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179

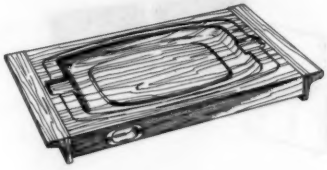
254,113
TABLE TOP
Carol A. Vroman, 1779 Tremainsville Rd., Apt. 232, Toledo, Ohio 43613
Continuation-in-part of Ser. No. 800,577, May 25, 1977, abandoned. This application Jan. 5, 1979, Ser. No. 1,271
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191



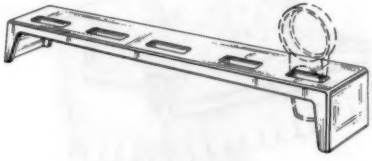
254,114
DISPLAY FOR PHOTOGRAPHS OR THE LIKE
George Lyman, Weston; Gregory Mathus, Sudbury, and Edward Yonkers, Newton, all of Mass., assignors to Data Packaging Corporation, Cambridge, Mass.
Filed Sep. 28, 1977, Ser. No. 837,617
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—234



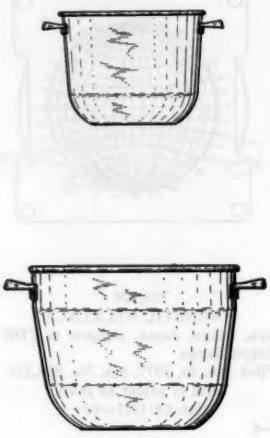
254,115
ELECTRICALLY HEATED CARVING TRAY
Kenneth J. McDonald, Strathfield, Australia, assignor to K-tel International (Aust.) Limited
Filed Aug. 3, 1977, Ser. No. 821,563
Claims priority, application Australia, Apr. 20, 1977, 71680
Term of patent 14 years
Int. Cl. D7—*99, 06*
U.S. Cl. D7—46



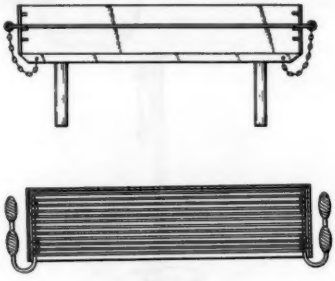
254,116
HOLDER FOR A MEASURING SPOON SET OR THE LIKE
Robert H. C. M. Daenen, Hekelgem, Belgium, assignor to Dart Industries, Inc., Los Angeles, Calif.
Filed Jan. 20, 1978, Ser. No. 871,060
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—74



254,117
POT
Hyman Kramer, 50 Carter Dr., Stamford, Conn. 06902
Filed Dec. 11, 1975, Ser. No. 639,719
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—97



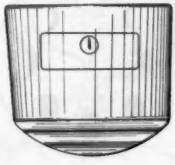
254,118
HEAVY DUTY OUTDOOR STOVE
Dwight C. Shaneour, Hillsdale, Mich., assignor to Quality Industries, Inc., Hillsdale, Mich.
Filed Aug. 15, 1977, Ser. No. 824,568
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—109



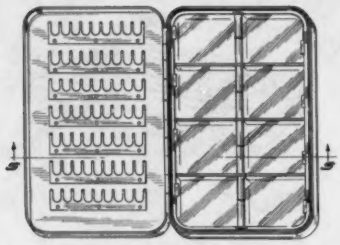
254,119
PORTABLE GRILL
Irving L. Mark, Chicago, Ill., assignor to Mark Design Ltd., Morton Grove, Ill.
Filed Nov. 25, 1977, Ser. No. 854,998
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—110

254,120
SAFETY RAIL FOR SLIDING PANELS
James L. Lang, Rt e, Box 3316, Selah, Wash. 98942
Filed Jun. 14, 1976, Ser. No. 695,866
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—331

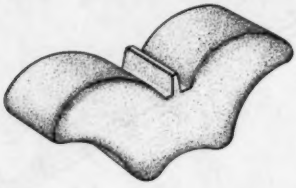
254,121
TRAILER KING PIN LOCK
Jerry D. Padgett, Jr., P.O. Box 1263, Lake Wales, Fla. 33853
Filed Sep. 26, 1977, Ser. No. 836,699
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—331



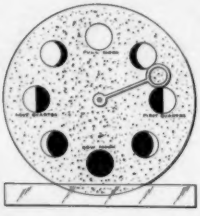
254,122
TACKLE BOX OR THE LIKE
Donald E. Wintz, St. Paul, Minn., assignor to Aladdin Manufacturing Company
Filed Feb. 22, 1977, Ser. No. 771,008
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—184



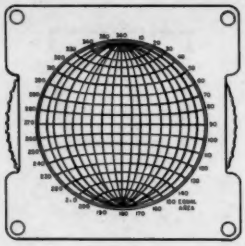
254,123
LOOSE FILL PACKAGING ELEMENT
Harry Bussey, Jr., P.O. Box 115, Serpentine Rd., Navesink, N.J. 07752
Filed Oct. 7, 1977, Ser. No. 840,294
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—294



254,124
MOON CLOCK
Martin L. Greenfield, One Prospect St., Great Neck, N.Y. 11021
Filed Sep. 1, 1977, Ser. No. 829,819
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—6

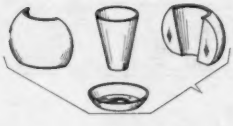


254,125
PLOTTING INSTRUMENT
Christopher M. Powell, 6, Elizabeth St., Ryde, New South Wales 2112, Australia
Filed Jun. 28, 1977, Ser. No. 811,001
Claims priority, application Australia, Feb. 3, 1977, 71120
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—61

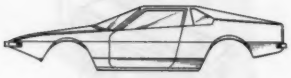


254,126
MAGNETIC NECKLACE
Masaaki Beniya, Tokyo, Japan, assignor to TDK Electronics Co., Ltd., Tokyo, Japan
Filed Jun. 20, 1977, Ser. No. 808,251
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—6

254,127
COMBINED FLOWERPOT TRAY, AND WATERING RESERVOIRS
Carlo M. Sgroi, Oceanside, N.Y., assignor to Pax Technology Ltd., Hicksville, N.Y.
Filed Aug. 30, 1978, Ser. No. 938,037
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—153

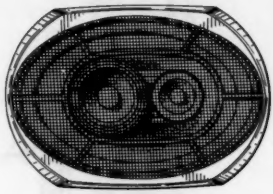


254,128
AUTOMOBILE BODY
Vito J. Carabetta, 124 West Ave. 42, Los Angeles, Calif. 90065
Filed Feb. 10, 1978, Ser. No. 876,854
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—91

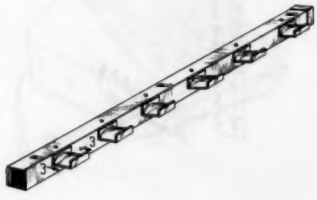


254,129
COMBINED CAMPER SUPPORT AND JACK
Howard B. Johnson, 2133 W. Lodi Ave., Lodi, Calif. 95240
Filed Oct. 25, 1977, Ser. No. 845,243
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—55

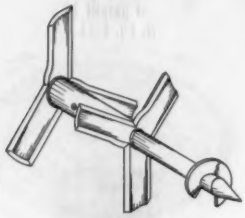
254,130
LOUDSPEAKER WITH GRILLE
Takekazu Iijima, Tokyo, Japan, assignor to Pioneer Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 9, 1978, Ser. No. 959,370
Claims priority, application Japan, May 10, 1978, 53-19180
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—30



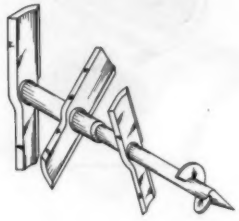
254,131
HEADPHONE DEMONSTRATION UNIT
Jeremy Prince 'Jeyshire', 17 Woodland Ave., Wokingham, Berkshire RA11 20K, England
Filed Dec. 6, 1978, Ser. No. 967,073
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—99



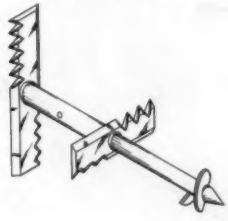
254,132
COMBINED AUGER AND TINE UNIT FOR A GARDEN TILLER
Gary L. Sheldon, Phillipsburg, Mo., assignor to Garden Maid, Inc., Lebanon, Mo.
Filed Jan. 30, 1978, Ser. No. 873,124
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—12



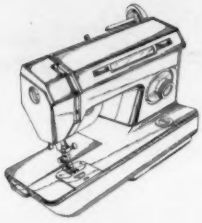
254,133
COMBINED AUGER AND TINE UNIT FOR A GARDEN TILLER
Gary L. Sheldon, Phillipsburg, Mo., assignor to Garden Maid, Inc., Lebanon, Mo.
Filed Jan. 30, 1978, Ser. No. 873,160
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—12



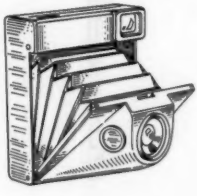
254,134
COMBINED AUGER AND TINE UNIT FOR A GARDEN TILLER
Gary L. Sheldon, Phillipsburg, Mo., assignor to Garden Maid, Inc., Lebanon, Mo.
Filed Jan. 30, 1978, Ser. No. 873,384
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—12



254,135
SEWING MACHINE
Cristian J. Felix, Flushing, N.Y., and Donald M. Genaro, Haworth, N.J., assignors to The Singer Company
Filed Aug. 23, 1977, Ser. No. 827,186
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D15—69

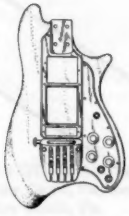


254,136
COLLAPSIBLE CAMERA
Otto Stemme, Munich, and Peter Lermann, Narring, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany
Filed Nov. 2, 1976, Ser. No. 738,232
Claims priority, application Fed. Rep. of Germany, May 9, 1976, MR 479
The portion of the term of this patent subsequent to Oct. 23, 1993, has been disclaimed.
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—21

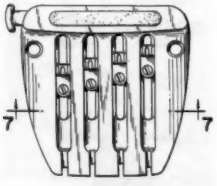


254,137
ORGAN CONSOLE
Thomas E. Kimble, Covington, Ky., assignor to D. H. Baldwin Company, Cincinnati, Ohio
Filed Jun. 27, 1977, Ser. No. 810,200
Term of patent 14 years
Int. Cl. D17—*01*
U.S. Cl. D17—6

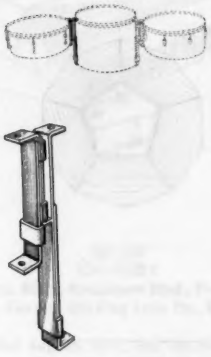
254,138
GUITAR BODY OR THE LIKE
James H. Rickard, Harwinton, Conn., assignor to Ovation Instruments, Inc., New Hartford, Conn.
Filed Jan. 19, 1977, Ser. No. 760,750
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D17—20



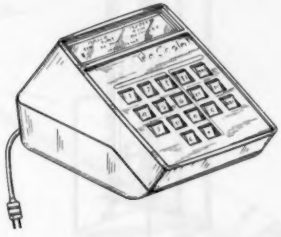
254,139
COMBINED TAILPIECE, BRIDGE AND MUTE UNIT FOR A GUITAR OR THE LIKE
James H. Rickard, Harwinton, Conn., assignor to Ovation Instruments, Inc., New Hartford, Conn.
Filed Jan. 19, 1977, Ser. No. 760,751
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D17—20



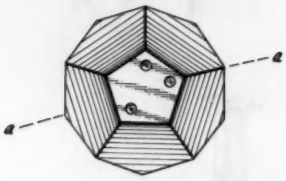
254,140
MULTIPLE DRUM BRACKET
Marvin V. Kuipers, 526 N. Peoria, Gilman, Ill. 60938
Filed Jul. 14, 1977, Ser. No. 815,516
Term of patent 14 years
Int. Cl. D17—*04*; D8—*08*
U.S. Cl. D17—22



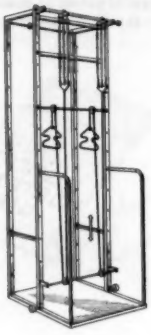
254,141
TELEPHONE CALL COST DETERMINING DEVICE
Robert J. De Masi, Massapequa, N.Y., assignor to Utility Verification Corp.
Filed Mar. 20, 1978, Ser. No. 888,034
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D18—7



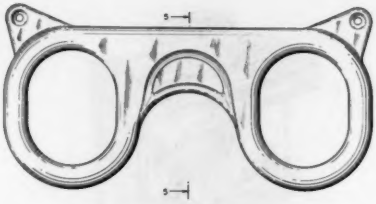
254,142
BOWLING GAME DIE OR SIMILAR ARTICLE
John Scherotto, 840 Roosevelt Ave., Secaucus, N.J. 07094
Filed Mar. 14, 1977, Ser. No. 777,529
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—41



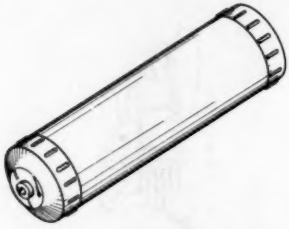
254,143
PHYSICAL EXERCISER
Johannes M. M. H. de Bock, Kasteel Exaetenstraat 1, Roermond, Netherlands
Filed May 2, 1978, Ser. No. 902,174
Claims priority, application Fed. Rep. of Germany, Nov. 2, 1977, URA 1040
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D21—195



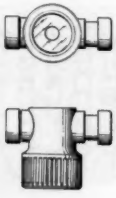
254,144
COMBINED TRAPEZE BAR AND HAND RINGS
Donal D. Hock, Herrin, Ill., assignor to Turco Manufacturing Company, Du Quoin, Ill.
Filed Apr. 12, 1978, Ser. No. 895,870
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D21—235



254,145
INLINE WATER FILTER
Anthony C. Wilcock, 75 E Palm Ave., Burbank, Calif. 91501
Filed Jun. 30, 1977, Ser. No. 812,001
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4

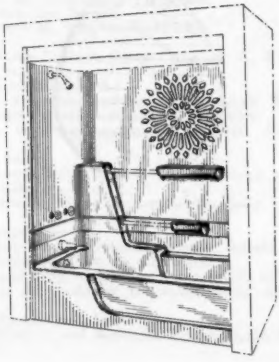


254,146
SHUT-OFF VALVE
Jerome Koenig, 3 Kadesh Barnea, Tel Aviv, Israel
Filed Jul. 29, 1977, Ser. No. 820,329
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19

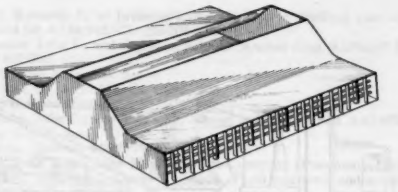


254,147
COMBINED WATER CONTROL LEVER AND COVER PLATE
Luigi Colani, Sassenberg, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.
Filed Sep. 18, 1978, Ser. No. 943,177
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—29

254,148
COMBINED BATHTUB AND SHOWER STALL
Fred C. Alexander, New Castle, Pa., assignor to Universal-Rundle Corporation, New Castle, Pa.
Filed Aug. 2, 1978, Ser. No. 930,154
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—49



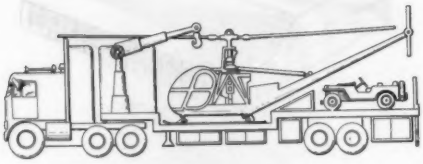
254,149
WATER INJECTED COOLING TOWER
John Engalitcheff, Jr., Gibson Island, Md., assignor to Baltimore Aircoil Company, Inc., Jessup, Md.
Filed Jul. 12, 1977, Ser. No. 815,037
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—139



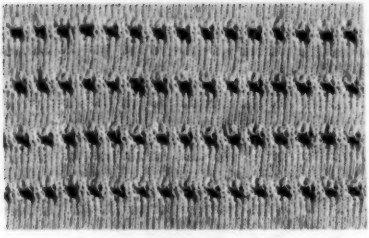
254,150
CAUTERY
Steven A. Barton, 401 S. Brazosport Blvd., Freeport, Tex. 77541, and David L. Gerard, 400 Flag Lake Dr., Lake Jackson, Tex. 77566
Filed Aug. 19, 1977, Ser. No. 826,239
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—26

254,151
COMBINED LIPSTICK AND CIGARETTE LIGHTER
Henry Wolff, 406 Trailer Village, Oakdale Rd., Johnson City, N.Y. 13790
Filed Oct. 31, 1977, Ser. No. 847,320
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—77

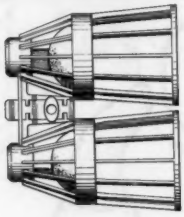
254,152
COMBINED TRACTOR, TRAILER, HELICOPTER AND VEHICLE TOY
Jay W. Marden, 18795 SW. 216th St., Miami, Fla. 33170
Filed Jul. 27, 1977, Ser. No. 819,586
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—134

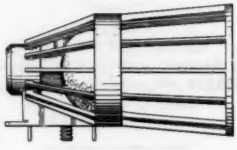


254,153
DOUBLE KNIT FABRIC
William O. Avins, Cleveland, Tenn., assignor to American Research and Knitting, Inc.
Filed May 27, 1977, Ser. No. 801,351
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D47—2

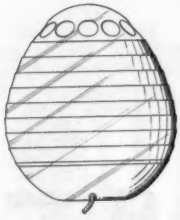


254,154
MOVIE LAMP OR SIMILAR ARTICLE
Warren H. Young, Marshfield; Nolan A. Drevitch, South Easton, and Anthony G. Rosati, Salem, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.
Filed Nov. 1, 1977, Ser. No. 847,689
Term of patent 14 years
Int. Cl. D26—*05*; D16—*05*
U.S. Cl. D48—20 K





254,155
ELECTRIC LAMP
Wesley D. Allen, 1002 Rebecca, Austin, Tex. 78758
Filed Dec. 8, 1977, Ser. No. 858,722
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 R



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TO WHOM

PATENTS WERE ISSUED ON THE 5TH DAY OF FEBRUARY, 1980

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Dick Company: *See*—
Borneman, Lawrence, 4,186,662, Cl. 101-218.000.

AB Westin & Backlund: *See*—
Sundstrom, Nils E., 4,186,649, Cl. 91-170.00R.

Abbazia, Leonard P.: *See*—
Koch, Edwin R.; Abbazia, Leonard P.; and Puglia, Wayne J., 4,187,320, Cl. 426-3.000.

Abbott Laboratories: *See*—
Carney, Ronald E.; McAlpine, James B.; and Perun, Thomas J., 4,187,372, Cl. 536-17.00R.
Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, 4,187,297, Cl. 424-180.000.
Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, 4,187,298, Cl. 424-180.000.
Paris, Gerard Y.; Cimon, Denis G.; Bariana, Dilbagh S.; and Fung, Anthony, 4,187,307, Cl. 424-251.000.
Post, Gerald G., 4,187,299, Cl. 424-181.000.
Tadanier, John S.; and Martin, Jerry R., 4,187,296, Cl. 424-180.000.

Abe, Hiroshi: *See*—
Tomita, Chuji; and Abe, Hiroshi, 4,187,429, Cl. 250-445.00T.

Abthoff, Jorg; Fricker, Ludwig; and Lammer, Jurgen, to Daimler-Benz Aktiengesellschaft. Installation for the preheating of the suction mixture of a carburetor internal combustion engine. 4,186,705, Cl. 123-122.0AC.

Adams, Frederick J., to Cam Gears Limited. Steering gears. 4,186,615, Cl. 74-89.150.

Advanced Circuit Technology: *See*—
Roberts, Joseph A., 4,187,388, Cl. 174-68.500.

Aero-Hydraulics Corporation: *See*—
Lipert, Peter, 4,187,263, Cl. 261-77.000.

Aerojet-General Corporation: *See*—
Bost, John J.; Cabeal, Jackie A.; and Rosenberg, Sanders D., 4,187,129, Cl. 149-21.000.
Wrightson, John M., 4,187,215, Cl. 528-51.000.

Aeroquip Corporation: *See*—
Nixon, Larry R., 4,186,947, Cl. 285-112.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Muller, Jean-Claude; Ponpon, Jean-Pierre; Kurek, Joseph; and Siffert, Paul, 4,187,124, Cl. 148-1.500.

AGFA-Gevaert, A.G.: *See*—
Schausberger, Helmut; and Brunner, Rudolf, 4,187,023, Cl. 354-321.000.

AGFA-Gevaert N.V.: *See*—
Kokelenberg, Hendrik E.; Sels, Francis J.; and Van Veelen, George F., 4,187,114, Cl. 430-510.000.

AHI Operations Limited: *See*—
Zijlstra, Jan G. H., 4,186,770, Cl. 137-572.000.

Ahn, Kie Y.; Cohen, Mitchell S.; Powers, John V.; and Tao, Lung-jo, to International Business Machines Corporation. Pedestal bubble domain chip and processes for making same. 4,187,553, Cl. 365-8.000.

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Aiba, Masahiko: *See*—
Matsunaga, Shoichi; Siozaki, Fumio; and Aiba, Masahiko, 4,187,512, Cl. 346-140.00R.

Aiphone Co., Ltd.: *See*—
Matsumoto, Jun, 4,187,401, Cl. 179-15.0BW.
Matsumoto, Jun, 4,187,402, Cl. 179-15.0BW.

Air Tech Industries Inc.: *See*—
Fraioli, Donato M., 4,186,530, Cl. 52-2.000.

Airco, Inc.: *See*—
Valenta, James D.; and Heruth, Kenneth T., 4,186,737, Cl. 128-203.280.

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Yamamoto, Yasunobu; Tomikawa, Ryoichi; Sakabe, Toshiaki; and Matsumoto, Yasuhiro, 4,187,133, Cl. 156-166.000.

Ajar, Charles G. Frame positioning apparatus. 4,187,010, Cl. 352-162.000.

Akashi, Goro: *See*—
Suzuki, Masaaki; Suzuki, Osamu; and Akashi, Goro, 4,187,341, Cl. 428-213.000.

Akczinski, Joseph, Sr. Slicing machine cleaning guard. 4,186,634, Cl. 83-478.000.

Akeyoshi, Kazuyuki: *See*—
Oishi, Rokuji; Okajima, Yasuharu; Noguchi, Satoshi; and Akeyoshi, Kazuyuki, 4,187,340, Cl. 428-210.000.

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Josef, Michael J.; and Romanski, Eric R., 4,186,780, Cl. 139-383.00A.

Albert, Kenneth J., to Inventor's Inc. Disposable drinking cup with valved lid. 4,186,842, Cl. 220-206.000.

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Burns, John E.; and Van Lith, Martin J., 4,186,453, Cl. 5-82.00R.

Alkem GmbH: *See*—
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Allan, David Thomson: *See*—
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Means, Howard W.; and Allick, Edward, 4,186,576, Cl. 70-233.000.

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Kurtz, Bruce E., 4,187,253, Cl. 260-662.00R.
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Roth, David W. H., Jr.; and Zudkevitch, David, 4,187,152, Cl. 203-62.000.

Allis-Chalmers Corporation: *See*—
Schucker, Thomas R., 4,187,032, Cl. 403-15.000.

Alper, Yekutiel; and Margolin, Amikam, to State of Israel, Ministry of Agriculture, The. Low level cultivation tunnels. 4,186,520, Cl. 47-1.00R.

Altenschopfer, Theodor: *See*—
Herold, Claus-Peter; Grodau, Dieter; and Altenschopfer, Theodor, 4,187,121, Cl. 134-26.000.

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Marcum, Maxie G., Jr., 4,186,538, Cl. 52-521.000.

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Husain, Ahmed, 4,186,787, Cl. 151-41.730.
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Stepniak, Frank M.; and Kominiak, Andrew A., 4,186,985, Cl. 339-111.000.

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Child, Ralph G.; Lang, Stanley A., Jr.; Lee, Ving J.; and Lin, Yang-i, 4,187,373, Cl. 542-402.000.

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Christoffel, William D., 4,186,732, Cl. 128-24.00R.
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American Solar: *See*—
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American Standard Inc.: *See*—
Safford, Laurance F., 4,187,392, Cl. 178-22.000.

American Technological University: *See*—
Telkes, Maria, 4,187,189, Cl. 252-70.000.

Amid, Ahamed A.: *See*—
Khan, Amir U.; Khan, Habib U.; and Amid, Ahamed A., 4,186,493, Cl. 33-161.000.

AMP Incorporated: *See*—
Bowen, Terry P.; and Bendiksen, Leonard F., 4,186,996, Cl. 350-96.200.
Cobaugh, Robert F.; and Coller, James R., 4,186,982, Cl. 339-17.00C.
Harwood, Robert G.; and Bowen, Terry P., 4,186,999, Cl. 350-96.210.
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Reavis, Robert P., Jr.; Soderstrom, Melvin A.; and Vachhani, Vasantrai A., 4,186,984, Cl. 339-103.00R.
Schumacher, William L., 4,186,995, Cl. 350-96.200.
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Radwill, Robert P.; and Moehling, Charles, 4,186,914, Cl. 267-4.000.

Analytical Radiation Corp.: *See*—
Wieder, Irwin, 4,187,475, Cl. 331-94.50S.

Anderson, John M.: *See*—
Stout, Virgil L.; and Anderson, John M., 4,187,447, Cl. 315-85.000.

Anderson, Kenneth W. Pipe end sealing system. 4,186,931, Cl. 277-207.00A.

Anderson, Robert L.: *See*—
Kaufman, Arnold S.; and Anderson, Robert L., 4,186,727, Cl. 126-299.00D.
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Ando, Seigo: *See*—
Yamada, Takeo; Ando, Seigo; Miyashita, Yoshio; Murakami, Katsuhiko; Tate, Masahisa; and Mizui, Kiyoshi, 4,186,792, Cl. 164-150.000.
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Anshus, Byron E.; Katsumoto, Kiyoshi; and Serkes, Ira M., to Chevron Research Company. Polymerization and recovery of 2-pyrrolidone with acid treatment. 4,187,370, Cl. 528-312.000.
Ansul Company, The: *See*—
Rasheed, Khalid; and Warkentin, James D., 4,187,096, Cl. 71-90.000.
Antonov, Vladimir A.: *See*—
Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M., 4,186,793, Cl. 164-158.000.
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Amelung, Robert J., 4,186,457, Cl. 5-452.000.
Aqua-Chem, Inc.: *See*—
Hatch, Gary L., 4,187,183, Cl. 210-501.000.
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Akiyama, Takashi; Tanji, Akinori; and Asano, Seiichi, 4,187,343, Cl. 428-288.000.
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Johannisson, Tom; Nilsson, Kai; Sjoblom, Rolf; and Widell, Marja, 4,186,582, Cl. 72-60.000.
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Langer, Heimo J.; and McKillip, William J., 4,187,349, Cl. 428-395.000.
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Jones, Giffin D.; and Asperger, Robert G., 4,187,256, Cl. 525-471.000.
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Fauconnet, Michel, 4,186,555, Cl. 60-330.000.
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Stone, John T., 4,186,784, Cl. 144-253.00J.
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Kouda, Masanori, 4,186,652, Cl. 91-434.000.
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Bertoglio, Guido, 4,186,990, Cl. 339-258.00R.
Aumann, James T., to Christensen, Inc. Dual spring drill string shock absorber. 4,186,569, Cl. 64-23.000.
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Wolfendale, Peter C. F., 4,187,459, Cl. 324-60.00C.
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Zezza, Louis J., 4,187,433, Cl. 250-507.000.
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Etienne, Michel, 4,187,436, Cl. 290-27.000.
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Avicola, Richard; and Tzakis, George J., to Zenith Radio Corporation. Full-wave rectifier. 4,187,537, Cl. 363-127.000.
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Bartrum, David E., 4,187,270, Cl. 264-171.000.
B. J. Hughes Inc.: *See*—
Heffernan, James P.; Sheldon, Loren B.; Tomashek, James R.; and Ward, Donald H., 4,187,546, Cl. 364-565.000.
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Weber, Ida, 4,186,498, Cl. 36-32.00R.
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Dijk, Jan A.; and Hegeman, Everhardus J., 4,187,132, Cl. 156-88.000.
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Bader, Henry; and Feingold, Michael H., to Polaroid Corporation. Novel synthesis of bis pyrazolone oxonol dyes. 4,187,225, Cl. 260-239.900.
Baermann, Max. Eddy-current device for measuring rotational speed. 4,186,609, Cl. 73-497.000.
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Baker, David E.; and Baker, Kenneth D. Portable campfire grill. 4,186,716, Cl. 126-29.000.
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Johnson, Reginald F., 4,186,544, Cl. 53-537.000.
Baker, William G.: *See*—
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Ballard, Samuel S.; and White, Ronald P., to Sanders Associates, Inc. Range determining system. 4,187,490, Cl. 367-121.000.
Balser, John L. Adjustable flash bracket. 4,187,021, Cl. 354-293.000.
Ban, Itsuki; and Kanno, Hidenori, to Secoh Giken Inc. Magnetic tape player comprising electromagnetic latch device. 4,187,522, Cl. 360-137.000.
Banucci, Eugene G.; and Olander, Walter K., to General Electric Company. Method for preparing polyphenylene oxides with manganese-vinyl resin complexes. 4,187,361, Cl. 525-4.000.

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Barclay, Donald J., to International Business Machines Corporation. Electrolyte for electrochromic display device. 4,187,003, Cl. 350-357.000.

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Barton, Robert M., 4,186,968, Cl. 299-39.000.

Bariana, Dilbagh S.: *See*—
Paris, Gerard Y.; Cimon, Denis G.; Bariana, Dilbagh S.; and Fung, Anthony, 4,187,307, Cl. 424-251.000.

Barnstead, John W., to Vernco Corporation. Flexible fan. 4,187,055, Cl. 416-132.00A.

Barth, Hans F.: *See*—
Becker, Gert; Schilp, Ulrich; and Barth, Hans F., 4,187,184, Cl. 252-8.800.

Bartha, Zoltan; Szor, Peter; and Haraszti, Jozsef, to Taurus Gumiipari Vallalat. Elastic pipe-connecting component for pipes or pipelines, or the like. 4,186,949, Cl. 285-226.000.

Bartley, John E.; Penrod, Orville R.; and Radosevich, Lawrence D. Terminal construction for electrical circuit device. 4,187,529, Cl. 361-404.000.

Barton, Robert M., to Barco Manufacturing Company. Roadway pavement planing machine. 4,186,968, Cl. 299-39.000.

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Goetz, Norbert; Mangold, Dietrich; and Zeeh, Bernd, 4,187,227, Cl. 548-226.000.
Patsch, Manfred; and Hettche, Albert, 4,187,226, Cl. 260-239.800.
Platz, Rolf; Fuchs, Werner; and Vodrazka, Wolfgang, 4,187,384, Cl. 568-618.000.
Rotter, Gerhard; and Schomann, Klaus D., 4,187,521, Cl. 360-118.000.
Sander, Bruno; Scherling, Kurt; Steinberger, Rolf; and Ropte, Eckhard, 4,187,143, Cl. 162-157.00R.

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Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,187,357, Cl. 521-159.000.

Battard, Jean-Claude; and Buisson, Jean, to Service d'Exploitation Industrielle des Tabacs et des Allumettes. Glue for articles in the tobacco industry. 4,187,119, Cl. 106-126.000.

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Harmer, Alan L., 4,187,025, Cl. 356-133.000.

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Bauer, Russell E. Air inlet for armored car. 4,186,817, Cl. 180-54.00A.

Baumann, Manfred; and Besserer, Walter, to Apura GmbH. Apparatus for dispensing sheets of web material of predetermined length. 4,186,633, Cl. 83-155.000.

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Rosenberger, Harold E., 4,187,005, Cl. 351-38.000.

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Seng, Florin; Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., 4,187,101, Cl. 71-92.000.

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Mayer, Karl H.; Heitzer, Helmut; Hoffmeister, Friedrich; Heise, Arend; and Kazda, Stanislav, 4,187,306, Cl. 424-251.000.
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Traubel, Harro; Dieterich, Dieter; and Heinze, Helga, 4,187,074, Cl. 8-94.190.
Wagner, Kuno, 4,187,354, Cl. 521-158.000.
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Zecher, Wilfried; Clarenz, Werner; Dunwald, Willi; and Merten, Rudolf, 4,187,365, Cl. 528-45.000.

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Gartner, Jurij; and Seidl, Jiri, 4,186,695, Cl. 123-52.00M.

BBC Brown, Boveri & Company, Ltd.: *See*—
Zimmermann, Andreas, 4,187,160, Cl. 204-180.00R.

Beauchamp, Ronald A., to Boise Cascade Corporation. Method for forming a composite container including a perforated label layer. 4,187,137, Cl. 156-195.000.

Bechtel International Corporation: *See*—
Chassagne, Pierre J., 4,187,044, Cl. 406-197.000.

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Becker, Gert; Schilp, Ulrich; and Barth, Hans F., to Lever Brothers Company. Softening composition. 4,187,184, Cl. 252-8.800.

Beckmann, Klaus, to Gewerkschaft Eisenhutte Westfalia. Apparatus for controlling the position of a mining machine. 4,186,969, Cl. 299-43.000.

Becton, Dickinson and Company: *See*—
Percarpio, Edward P., 4,186,840, Cl. 215-247.000.

Beduchaud, Michel; and de Loye, Martin, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Facsimile transmission installation in particular for copying forms. 4,187,520, Cl. 358-257.000.

Beecham Group Limited: *See*—
Cassidy, Frederick; and Lake, Antony W., 4,187,312, Cl. 424-274.000.
Luk, Kong, 4,187,228, Cl. 260-245.300.

Beisner, Klaus: *See*—
Brachthauser, Kunibert; Ramesohl, Hubert; Beisner, Klaus; and Herchenbach, Horst, 4,187,071, Cl. 432-106.000.

Bekbulatov, Ildgam A.; Mamatov, Juldash; Varlamov, Gennady D.; Madaliev, Shavkat; and Gaibov, Valery M. Process for producing power-like furan resin. 4,187,368, Cl. 525-503.000.

Beke, Zoltan; and Kukla, George W., to Dominion Engineering Works Limited. Web drier section. 4,186,496, Cl. 34-114.000.

Bell Telephone Laboratories, Incorporated: *See*—
Billings, Robert L.; Chen, Ho-Sou; Gyorgy, Ernst M.; and Sherwood, Richard C., 4,187,128, Cl. 148-121.000.
Bjorklund, Gary C.; and Storz, Ralph H., 4,187,027, Cl. 356-400.000.
Bobeck, Andrew H., 4,187,555, Cl. 365-19.000.
Chandross, Edwin A.; and Tomlinson, Walter J., III, 4,187,111, Cl. 430-2.000.
Denkin, Nathan M.; and Runge, Peter K., 4,186,994, Cl. 350-96.170.
Maxfield, Thomas G.; and Witmore, Ronald K., 4,187,399, Cl. 179-15.0BY.
Singh, Shobha; Van Uitert, LeGrand G.; and Zydzik, George J., 4,187,530, Cl. 361-433.000.

Beltone Electronics Corporation: *See*—
Yum, Dooho, 4,187,472, Cl. 330-260.000.

Bendiksen, Leonard F.: *See*—
Bowen, Terry P.; and Bendiksen, Leonard F., 4,186,996, Cl. 350-96.200.

Bendix Corporation, The: *See*—
Blatter, Albert; and Miller, John, 4,186,602, Cl. 73-228.000.
Bourdon, Normand C.; and Sanford, Richard, 4,187,272, Cl. 264-318.000.
Kytta, Oswald O., 4,186,650, Cl. 91-369.00A.
Preston, Gary W.; Johannesen, Donald D.; and Kestermeier, William J., 4,186,824, Cl. 188-73.500.
Taig, Alistair G., 4,186,774, Cl. 137-625.230.

Bendix Westinghouse Limited: *See*—
Taig, Alistair G., 4,186,651, Cl. 91-375.00R.

Benkoe, Elisabeth, executrix for the estate of Erwin Benkoe: *See*—
Goldfarb, Adolph E.; Benkoe, Erwin, deceased; and Robinson, Don, 4,186,925, Cl. 273-389.000.

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Bentley, Stanley L., to Ransburg Corporation. Electrostatic coating system. 4,187,527, Cl. 361-235.000.

Berg, Fred W., to Shock-M-All, Inc. Electrified insect trap having short circuiting means. 4,186,512, Cl. 43-98.000.

Berger, Erich: *See*—
Binder Kriegelstein, Wolfgang; and Berger, Erich, 4,186,480, Cl. 29-603.000.

Berkenblit, Melvin; and Reisman, Arnold, to International Business Machines Corporation. Method for etching silicon and a residue and oxidation resistant etchant therefor. 4,187,140, Cl. 156-662.000.

Berkey-Colortran, Inc.: *See*—
Tichenor, Clyde L.; and LeVasseur, Craig, 4,187,534, Cl. 362-268.000.

Bernard Dalsin Manufacturing Company: *See*—
Dalsin, Bernard L., 4,186,719, Cl. 126-143.000.

Bernasconi, Raymond; and Ferrini, Pier G., to Ciba-Geigy Corporation. Alkanecarboxylic acid compounds which have benzofuranyl or benzothienyl substituents. 4,187,234, Cl. 260-346.220.

Bertoglio, Guido, to Augat Inc. Lead socket insert. 4,186,990, Cl. 339-258.00R.

Berven, Richard P.: *See*—
Durre, Reynold F.; and Berven, Richard P., 4,187,091, Cl. 55-499.000.

Besedina, Eleonora B.: *See*—
Sladkoshteev, Vladimir T.; Shatagin, Oleg A.; Khalemsky, Samuil F.; and Besedina, Eleonora B., 4,186,791, Cl. 164-66.000.

Besserer, Walter: *See*—
Baumann, Manfred; and Besserer, Walter, 4,186,633, Cl. 83-155.000.

Bessho, Hironori: *See*—
Yasuda, Yushiro; and Bessho, Hironori, 4,186,697, Cl. 123-117.00A.

Bettcher Industries, Inc.: *See*—
Bettcher, Louis A., 4,186,462, Cl. 17-25.000.

Bettcher, Louis A., to Bettcher Industries, Inc. Tenderizer. 4,186,462, Cl. 17-25.000.

Beverly, Frank O.; and Nagel, Karl H. Swimming pool alarm system. 4,187,502, Cl. 340-566.000.

Bidon, Jacques. Tractor vehicle in particular for agricultural use. 4,186,811, Cl. 180-6.480.

Bielinski, Ralph F.: *See*—
Haker, Edwin J.; Riddle, Charles F.; and Bielinski, Ralph F., 4,187,036, Cl. 404-117.000.

Bihler, Otto. Drive arrangement for a tool carriage of a machine tool. 4,186,581, Cl. 72-26.000.

Billings Energy Corporation: *See*—
Woolley, Ronald L., 4,187,092, Cl. 62-48.000.

Billings, Robert L.; Chen, Ho-Sou; Gyorgy, Ernst M.; and Sherwood, Richard C., to Bell Telephone Laboratories, Incorporated. Magnetic devices including amorphous alloys. 4,187,128, Cl. 148-121.000.

Billingsley, Lloyd E.; and Latham, Raymond E., to Comex Marine Services, Inc. Coupling apparatus. 4,186,950, Cl. 285-270.000.

Bilsback, Malvin S. Self-storing bucksaw. 4,186,785, Cl. 145-32.00R.

Binder, Dieter: *See*—
Hromatka, Otto; Binder, Dieter; Zeller, Paul; and Pfister, Rudolf, 4,187,303, Cl. 424-246.000.
Binder Kriegelstein, Wolfgang; and Berger, Erich, to U.S. Philips Corporation. Method of manufacturing a rotatable magnetic head arrangement. 4,186,480, Cl. 29-603.000.
Biondetti, Mario, to Escher Wyss Limited. Support element for controlled deflection roll. 4,186,472, Cl. 29-113.0AD.
Biotherm: *See*—
Marissal, Janine, 4,187,291, Cl. 424-94.000.
Birkmeyer, William J.: *See*—
Erikson, J. Alden; Lewarchik, Ronald J.; and Birkmeyer, William J., 4,187,380, Cl. 548-310.000.
Bizzarro, Peter; and Warner, John L., to United Technologies Corporation. Heat exchanger water collection system. 4,187,090, Cl. 55-269.000.
BJ-Hughes Inc.: *See*—
Work, John T., 4,186,973, Cl. 308-3.900.
Bjorklund, Gary C.; and Storz, Ralph H., to Bell Telephone Laboratories, Incorporated. Servo-control alignment of nonlinear crystals. 4,187,027, Cl. 356-400.000.
Black, Robert D.; Hennen, John J.; and Krafka, Jerry L., to Deere & Company. Forage harvester recutter screen. 4,186,889, Cl. 241-89.200.
Blaine, Louis I.: *See*—
Kunin, Robert; and Blaine, Louis I., 4,187,120, Cl. 127-46.00A.
Blanchard, Robert R.: *See*—
Hutchinson, Loyd B.; and Blanchard, Robert R., 4,187,269, Cl. 264-171.000.
Bland, William M., Jr.; and Fields, Edison M. Alternate path cooling system for liquid cooled devices such as engines. 4,186,872, Cl. 236-34.500.
Blatter, Albert; and Miller, John, to Bendix Corporation, The. High response automotive mass air flow sensor. 4,186,602, Cl. 73-228.000.
Blaw-Knox Foundry & Mill Machinery, Inc.: *See*—
Eibe, Werner W., 4,186,579, Cl. 72-8.000.
Blohm, Thomas R.; Grisar, J. Martin; and Parker, Roger A., to Richardson-Merrell Inc. Substituted benzaldehyde hypolipidemic agents. 4,187,319, Cl. 424-333.000.
Blum, Seymour, to H-G Toys, Inc. Toy nursing bottle. 4,186,513, Cl. 46-1.00D.
Bobeck, Andrew H., to Bell Telephone Laboratories, Incorporated. Conductor access magnetic bubble memory arrangement. 4,187,555, Cl. 365-19.000.
Boeing Company, The: *See*—
Shorey, Thomas H., 4,186,901, Cl. 244-137.00R.
Boeing Construction Equipment Company: *See*—
Squifflet, Edmond C., Sr., 4,187,047, Cl. 414-332.000.
Boekhorst, Antonius, to U.S. Philips Corporation. Color picture display device with a circuit for generating a screen grid voltage. 4,187,451, Cl. 315-381.000.
Bohlmann, Orville R. Loading and unloading apparatus for a van. 4,187,048, Cl. 414-542.000.
Bohringer, Karl; Reichle, Peter; and Schwerdt, Paul, to Daimler-Benz Aktiengesellschaft. Torque measuring arrangement. 4,186,596, Cl. 73-136.00C.
Boise Cascade Corporation: *See*—
Beauchamp, Ronald A., 4,187,137, Cl. 156-195.000.
Lindhag, Carl L., 4,186,630, Cl. 82-4.00C.
Bollag, Werner; Ruegg, Rudolf; and Ryser, Gottlieb, to Hoffmann-La Roche Inc. 9-Substituted phenyl-3,7-dimethyl-nona 2,4,6,8-tetraene compounds. 4,187,247, Cl. 260-574.000.
Bollen, Manfred: *See*—
Brandenberger, Albert; and Bollen, Manfred, 4,186,896, Cl. 242-131.000.
Bolles, Charles P., to General Motors Corporation. Ignition distributor housing anti-rotational locking arrangement. 4,186,709, Cl. 123-146.50A.
Bollinger, Howard N.: *See*—
Kuhn, James O.; Wright, James J.; and Bollinger, Howard N., 4,186,517, Cl. 46-119.000.
Bolshakov, Anatoly I.: *See*—
Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M., 4,186,793, Cl. 164-158.000.
Boman, Per; and Broms, Bengt, to Linden-Alimak A.B. Method for consolidating a body of earth. 4,187,041, Cl. 405-263.000.
Bond, James W.; and Dressel, Gary A., to United States of America, Navy. Double precision residue combiners/coders. 4,187,549, Cl. 364-746.000.
Bonnice, Phillip E., to General Electric Company. Rotary drill bit and method for making same. 4,186,628, Cl. 76-108.00A.
Bootmakers of Sturgeon Bay, Inc., The: *See*—
Foster, Lloyd B., 4,186,502, Cl. 36-136.000.
Boratgis, James P.; and Pittman, Earle S. Refrigerator electronic temperature control and malfunction signal apparatus. 4,187,093, Cl. 62-126.000.
Borg-Textile Corporation: *See*—
Woythal, Gerald C., 4,186,892, Cl. 242-55.19R.
Borneman, Lawrence, to A. B. Dick Company. Duplexing copying system. 4,186,662, Cl. 101-218.000.
Bornengo, Giorgio: *See*—
Merlo, Fabrizio; Bornengo, Giorgio; and Paffoni, Camillo, 4,187,218, Cl. 260-158.000.
Bornsztein, Rene, to Service d'Exploitation Industrielle des Tabacs et des Allumettes. Process for forming a large sheet of natural tobacco for manufacturing particularly cigar wrappers. 4,186,757, Cl. 131-149.000.
Borroughs Tool & Equipment Corporation: *See*—
Okamuro, James A., 4,186,598, Cl. 73-144.000.
Bost, John J.; Cabeal, Jackie A.; and Rosenberg, Sanders D., to Aerojet-General Corporation. Gelled mechanically stable high energy fuel composition containing metal platelets. 4,187,129, Cl. 149-21.000.
Bourdon, Normand C.; and Sanford, Richard, to Bendix Corporation, The. Method of making molded electrical connector insert. 4,187,272, Cl. 264-318.000.
Bourigault, Raymond, to Materiel et Auxiliaire de Signalisation et de Controle pour l'Automation. Set of thermocouples for measuring the average of several temperatures in a given space. 4,186,605, Cl. 73-341.000.
Bourns, Inc.: *See*—
Laube, David E.; and Simpson, Loran R., 4,186,483, Cl. 29-630.00B.
Boutmy, Patrick E.; and Camborde, Jean-Marc A., to Etat Francaise; and Societe Anonyme de Telecommunications. Remote locating system for transmission faults in data transmission line having regenerative repeaters. 4,187,415, Cl. 179-175.30F.
Boutros, Kamal S., to Bunker Ramo Corporation. EMI Filter connector having RF suppression characteristics. 4,187,481, Cl. 333-182.000.
Bouvard, Hans: *See*—
Immler, Rolf; and Bouvard, Hans, 4,187,304, Cl. 424-249.000.
Immler, Rolf; and Bouvard, Hans, 4,187,305, Cl. 424-249.000.
Bowen, John P.: *See*—
Westcott, Vernon C.; and Bowen, John P., 4,187,170, Cl. 209-1.000.
Bowen, Terry P.; and Bendiksen, Leonard F., to AMP Incorporated. Optic adaptor junction. 4,186,996, Cl. 350-96.200.
Bowen, Terry P.: *See*—
Harwood, Robert G.; and Bowen, Terry P., 4,186,999, Cl. 350-96.210.
Bowler, Lauren L., to General Motors Corporation. Fuel injection apparatus with wetting action. 4,186,708, Cl. 123-139.0AW.
Bracalielly, Albert J.; Kautz, Glenn E.; Lindner, Robert G.; and Davis, Bernard H., to H. H. Robertson Company. Method and apparatus for producing shaped glass fiber reinforced cementitious articles. 4,187,275, Cl. 264-511.000.
Brachthauser, Kunibert; Ramesohl, Hubert; Beisner, Klaus; and Herchenbach, Horst, to Klockner-Humboldt=Deutz Aktiengesellschaft. Method for the treatment of finely grained material, particularly for the precalcining of cement. 4,187,071, Cl. 432-106.000.
Braga, Luigi F., to Viscodynamics Corporation. Apparatus for melting and extruding thermofusible material. 4,186,852, Cl. 222-146.0HE.
Braid, Milton, to Mobil Oil Corporation. Lubricant compositions containing esters of benzotriazolecarboxylic acid. 4,187,186, Cl. 252-51.50R.
Brambilla, Luigi: *See*—
Scholz, Hansjurgen; Brambilla, Luigi; and Backhaus, Hans-Gerd, 4,186,941, Cl. 280-743.000.
Brandel, Kurt, to Standard Sichtgerate GmbH. Tab-strip for filing systems. 4,186,505, Cl. 40-360.000.
Brandenberger, Albert; and Bollen, Manfred, to Maschinenfabrik Benninger AG. Apparatus for balloon ,limiting at a bobbin creel. 4,186,896, Cl. 242-131.000.
Brandt, Michael W. Chemical injector. 4,186,783, Cl. 141-18.000.
Braun, Howard E.; Dollard, Walter J.; and Tower, Stephen N., to Westinghouse Electric Corp. Recirculation system for nuclear reactors. 4,187,147, Cl. 176-38.000.
Braun, Stephen A.: *See*—
Nowak, Klaus F.; and Braun, Stephen A., 4,186,819, Cl. 181-265.000.
Braunling, Hermann: *See*—
Deinhammer, Wolfgang; Kaufmann, Rudolf; Braunling, Hermann; and Haberle, Norman, 4,187,237, Cl. 260-347.300.
Brekke, John H. Device and method for treating and healing a newly created bone void. 4,186,448, Cl. 3-1.900.
Brenner, Douglas. Blend composition of an oil and a neutralized sulfonated elastomeric polymer. 4,187,206, Cl. 260-23.50A.
Brenner, Robert A.; and Cuthbert, Victor W., to Whirlpool Corporation. Rinse out centrifugally operated dispenser for automatic washer. 4,186,573, Cl. 68-12.00R.
Breslow, Jeffrey D.; and Jaworski, Eugene, to Marvin Glass & Associates. Pneumatic projector game with central target. 4,186,927, Cl. 273-357.000.
Breslow, Jeffrey D.: *See*—
Kulesza, Ralph J.; and Breslow, Jeffrey D., 4,186,926, Cl. 273-340.000.
Brice, John C.; Hill, Owen F.; and Pratt, Ronald G., to U.S. Philips Corporation. Growth of single crystal bismuth silicon oxide. 4,187,139, Cl. 156-600.000.
Bridgman, Harold. Vehicle canopy. 4,186,758, Cl. 135-5.0AT.
Brittain, David R.; Brown, Edward D.; Hepworth, Walter; and Stacey, Gilbert J., to Imperial Chemical Industries Limited. 1,2-Dihydro-2-oxoquinol-4-ylacetic acid derivatives and pharmaceutical compositions. 4,187,310, Cl. 424-258.000.
Britzman, Agnita. Disposable bib. 4,186,443, Cl. 2-49.00R.
Brock, Steven F.: *See*—
Anderson, Robert W.; Brock, Steven F.; and Gee, May L., 4,186,871, Cl. 235-380.000.
Broms, Bengt: *See*—
Boman, Per; and Broms, Bengt, 4,187,041, Cl. 405-263.000.

Brook, Richard L., to DeSoto, Inc. Encapsulated impregnated rovings. 4,187,347, Cl. 428-375.000.

Brother Kogyo Kabushiki Kaisha: *See—*
Yamashita, Chikao; Sugaya, Takao; and Yoshida, Noriyuki, 4,186,675, Cl. 112-158.00D.

Brown, Charles E. Mail box. 4,186,869, Cl. 232-17.000.

Brown, David S. Holder for filter screens. 4,187,178, Cl. 210-232.000.

Brown, Douglas B., to Stake Technology Ltd. Apparatus for conveying particulate material. 4,186,658, Cl. 100-148.000.

Brown, Edward D.: *See—*
Brittain, David R.; Brown, Edward D.; Hepworth, Walter; and Stacey, Gilbert J., 4,187,310, Cl. 424-258.000.

Brown, Harold F.: *See—*
MacKendrick, William J.; and Brown, Harold F., 4,186,826, Cl. 192-13.00R.

Brown, Maurice H. Wire control mechanism. 4,186,897, Cl. 242-147.00R.

Brown, Robert W.: *See—*
Wellman, Russel E.; and Brown, Robert W., 4,187,194, Cl. 252-316.000.

Brown, Thomas, to Chinook Utility Products, Inc. Vehicle and process for retrieving flexible pipe. 4,186,894, Cl. 242-86.600.

Brown, Winthrop, to Texaco Inc. Torque meter means with reverse rotation detection. 4,186,597, Cl. 73-136.00A.

Brudy, Otto, to Dominion Auto Accessories Limited. Retractable truck mirror. 4,186,905, Cl. 248-478.000.

Brunberg, Ernst-Ake; and Olsson, Ray. Method and system for storing and extracting low-temperature heat energy. 4,186,794, Cl. 165-2.000.

Bruner, A. J.; Foster, Edward T.; and Kearns, Thomas N. Barrier. 4,186,913, Cl. 256-13.100.

Brunner, Rudolf: *See—*
Schausberger, Helmut; and Brunner, Rudolf, 4,187,023, Cl. 354-321.000.

Brunswick Corporation: *See—*
Fitzner, Arthur O.; and Hager, James R., 4,186,712, Cl. 123-148.0CB.

Brusasco, Enzo, to Roltra S.p.A. Screw-nut screw transmission coupling. 4,186,620, Cl. 74-424.80R.

Brusasco, Enzo, to Roltra S.p.A. Screw-nut screw transmission coupling. 4,186,621, Cl. 74-459.000.

Bryan, John F., III: *See—*
Slater, Norbert G., 4,187,409, Cl. 219-121.00P.

Bryce, Graham W.; and Hunter, Joseph J., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the. Arc welding. 4,187,411, Cl. 219-137.200.

Bucalo, Louis. Methods for collecting body fluids. 4,186,730, Cl. 128-769.000.

Buckeye International Inc.: *See—*
Farrell, Claude S., Jr.; Cone, Richard E., II; and Ellies, Alan D., 4,186,961, Cl. 297-216.000.

Buckley, Albert P.; and Dill, Melville R., Jr., to United States of America, Boston. Pallet. 4,186,841, Cl. 220-6.000.

Buckley, Thomas F.; and Gleason, John G., to SmithKline Corporation. Process for preparing oxazine ring compounds. 4,187,375, Cl. 544-92.000.

Buisson, Jean: *See—*
Battard, Jean-Claude; and Buisson, Jean, 4,187,119, Cl. 106-126.000.

Bujadoux, Karel; Neyer, Jean-Marie; and Houzeaux, Jean-Pierre, to Societe Chimique des Charbonnages - CdF Chimie. Grignard reagents and processes for making them. 4,187,254, Cl. 260-665.00G.

Bulle, Marshall R. Trailer hitch ring lock. 4,186,575, Cl. 70-14.000.

Bunch, Jesse C.: *See—*
Cary, Susan E.; and Bunch, Jesse C., 4,186,477, Cl. 29-432.000.

Bunker Ramo Corporation: *See—*
Boutros, Kamal S., 4,187,481, Cl. 333-182.000.

Burakov, Savely L.: *See—*
Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M., 4,186,793, Cl. 164-158.000.

Burd, Dennis E.: *See—*
Lockyer, George D., Jr.; Burd, Dennis E.; Sweeney, Richard F.; Sukornick, Bernard; and Ulmer, Harry E., 4,187,386, Cl. 585-367.000.

Burdick, Robert E., to Rolair Systems, Inc. Steerable drive unit for transporter. 4,186,813, Cl. 180-13.000.

Burghardt, Wilfried; Vogel, Rolf; and Zauser, Ludwig, to Hans Kolb GmbH & Co. Safety belt retractor. 4,186,895, Cl. 242-107.40B.

Burian, Milan: *See—*
Svub, Veroslav; Burian, Milan; Uruba, Vladimir; and Figalla, Zdenek, 4,187,134, Cl. 156-170.000.

Burk, Marvin C.: *See—*
Davis, Thomas T.; and Burk, Marvin C., 4,187,540, Cl. 364-200.000.

Burns, John E.; and Van Lith, Martin J., to Alfred Hospital. Restraint package. 4,186,453, Cl. 5-82.00R.

Burton, Geoffrey W.; and Morley, Edward G., to Plessey Handel und Investments AG. Hydraulic pump with an improved sealing arrangement. 4,186,929, Cl. 277-27.000.

Burton, James A., to Hydril Company. Pulsation dampener or surge absorber. 4,186,776, Cl. 138-30.000.

Burton, Perry E., to Opelika Manufacturing Corp. Sewing machine monitor. 4,186,672, Cl. 112-273.000.

Butler, Donald E., to Warner-Lambert Company. 3-Aryloxy-1-carboalkoxyethylpyridinium compounds and compositions. 4,187,311, Cl. 424-263.000.

Butler, Donald E., to Warner-Lambert Company. 3-Aryloxy-2-pyridinecarbonitrile 1-oxide compounds. 4,187,379, Cl. 546-288.000.

Buyce, Dwight D., to Chem-Trend, Inc. Liquid mixing and delivering aparatus. 4,186,769, Cl. 137-566.000.

Byler, William H., to William H. Byler and Thelma Byler, Trustees of William H. Byler Revocable Trust. Body warming device. 4,186,746, Cl. 128-403.000.

Byrd, Clyde L., Jr. Accident screen. 4,186,912, Cl. 256-1.000.

C.G.R. - MeV: *See—*
Levaillant, Claude, 4,187,176, Cl. 210-151.000.

Cabeal, Jackie A.: *See—*
Bost, John J.; Cabeal, Jackie A.; and Rosenberg, Sanders D., 4,187,129, Cl. 149-21.000.

Caffrey, Terence, to Davey Compressor Company. Bleed valve particularly for a multi-stage compressor. 4,186,767, Cl. 137-501.000.

California Institute of Technology: *See—*
Rembaum, Alan; Yen, Shiao-Ping S.; and Klein, Elias, 4,187,333, Cl. 427-230.000.

Calmes, Jean P.: *See—*
Passoni, Teresio; Calmes, Jean P.; Cattaneo, Filippo; and Nessi, Aurindo, 4,186,585, Cl. 72-208.000.

Cam Gears Limited: *See—*
Adams, Frederick J., 4,186,615, Cl. 74-89.150.

Camborde, Jean-Marc A.: *See—*
Boutmy, Patrick E.; and Camborde, Jean-Marc A., 4,187,415, Cl. 179-175.30F.

Campbell, Maury B., to Owl-Cam Inc. Waste matter removal implement and receptacle. 4,186,955, Cl. 294-1.00R.

Campbell, Robert W., to Phillips Petroleum Company. Formation of terephthalamide polymer of 5-methyl-1,9-nonanediamine. 4,187,371, Cl. 528-340.000.

Camrex Research and Development, Ltd.: *See—*
Robinson, Alan V.; and Chapman, John, 4,187,211, Cl. 260-42.440.

Camsco, Inc.: *See—*
Leslie, Elmer N.; Higgins, Bobby; and Huff, Joe T., 4,186,632, Cl. 83-13.000.

Camtron Electronics International Ltd.: *See—*
Katsof, Barry; and Matlin, Joel, 4,187,015, Cl. 354-109.000.

Canale, Albert S.: *See—*
Canale, Ralph D.; and Canale, Albert S., 4,187,029, Cl. 366-153.000.

Canale, Ralph D.; and Canale, Albert S. Apparatus and method for preparing lithographic fountain solution. 4,187,029, Cl. 366-153.000.

Canamero, Ernest: *See—*
Ernster, Peter J.; Canamero, Ernest; and Cockroft, James B., 4,187,412, Cl. 219-441.000.

Canon Kabushiki Kaisha: *See—*
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,187,019, Cl. 354-33.000.

Cantor, Burton M., to Personal Security Concepts, Inc. Non-lethal personal defense weapon. 4,186,851, Cl. 222-113.000.

Cantrell, Henry L., to Midland-Ross Corporation. Fault monitoring and indicator system. 4,187,504, Cl. 340-652.000.

Carey, Richard D., to Dayco Corporation. Hose construction having integral fire extinguishant and method of making same. 4,186,778, Cl. 138-103.000.

Carl M. Loeb Trust: *See—*
Loeb, Carl M., Jr., 4,186,900, Cl. 244-113.000.

Carl Still, Firma: *See—*
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; and Wollenhaupt, Karl-Heinz, 4,187,079, Cl. 44-10.00C.

Carley, Jay L.: *See—*
Popiel, Stanley; DuBois, R. Clark; Carley, Jay L.; and Hamma, John C., 4,186,837, Cl. 209-565.000.

Carlson, Ronald H., to FMC Corporation. Removal of contaminants from cyanuric acid reaction product. 4,187,376, Cl. 544-192.000.

Carlson, William L., Jr., to General Signal Corporation. Mechanical movement. 4,186,613, Cl. 74-52.000.

Carney, Ronald E.; McAlpine, James B.; and Perun, Thomas J., to Abbott Laboratories. Seldomycin factor 5 derivative. 4,187,372, Cl. 536-17.00R.

Carnival Toys, Inc.: *See—*
Dorfman, Steven R., 4,186,641, Cl. 84-1.160.

Caro, Edward R., to United States of America, National Aeronautics and Space Administration. High power RF coaxial switch. 4,187,416, Cl. 200-153.00S.

Carrier Corporation: *See—*
Clark, William E.; Herb, Carl C.; and Greene, Reginald S., 4,186,876, Cl. 236-49.000.

Carvalho, Elmer R., to D G Shelter Products Company. Removable closure panel and releasable spring hinge means therefor. 4,186,525, Cl. 49-465.000.

Cary, Susan E.; and Bunch, Jesse C. Cash register bag sealing system and method. 4,186,477, Cl. 29-432.000.

Cassata, Antonio: *See—*
Giannini, Umberto; Cassata, Antonio; Longi, Paolo; and Mazzocchi, Romano, 4,187,196, Cl. 252-429.00B.

Cassidy, Frederick; and Lake, Antony W., to Beecham Group Limited. 3-Hydroxy-4,4-dimethyl-5-pyrrolidone derivatives. 4,187,312, Cl. 424-274.000.

Caterpillar Tractor Co.: *See—*
Barbee, Gail G., 4,187,050, Cl. 414-723.000.
Chamberlain, Richard W., 4,186,626, Cl. 74-801.000.

Hart, Cullen P., 4,186,814, Cl. 180-24.000.
Hart, Cullen P., 4,186,815, Cl. 180-41.000.
Shulke, David D., 4,186,930, Cl. 277-166.000.
Sutton, Robert A., 4,186,812, Cl. 180-9.500.

Cattaneo, Filippo: *See*—
Passoni, Teresio; Calmes, Jean P.; Cattaneo, Filippo; and Nessi, Aurindo, 4,186,585, Cl. 72-208.000.

Caviglia, James P., III. Knockdown beehive frame. 4,186,458, Cl. 6-10.000.

Cayrol, Pierre-Henri. Printed circuits. 4,187,339, Cl. 428-208.000.

Celanese Corporation: *See*—
Yates, Derek N.; and Presta, John C., 4,187,135, Cl. 156-187.000.

Centre Electronique Horloger SA: *See*—
Martin, Jean-Claude; and Perotto, Jean F., 4,187,518, Cl. 358-93.000.

Centronics Data Computer Corp.: *See*—
Robinson, Prentice, 4,187,511, Cl. 346-75.000.

Cerny, Jacqueline; and Troncy, Robert, to Rhone-Poulenc Industries. Flameproofed polyamide containing red phosphorous. 4,187,207, Cl. 260-37.00N.

Cesaro, Giulio. Automatic injecting gun for remote controlled vaccination of cattle, pigs, and animals in general. 4,186,741, Cl. 128-218.00P.

Cessna Aircraft Company, The: *See*—
Vesel, Andrew M., 4,187,439, Cl. 307-271.000.

Chalk, Alan J., to General Electric Company. Catalytic aromatic carbonate process. 4,187,242, Cl. 260-463.000.

Chamberlain, Alan H. Reversible transmission. 4,186,625, Cl. 74-780.000.

Chamberlain, Richard W., to Caterpillar Tractor Co. Wheel final drive assembly. 4,186,626, Cl. 74-801.000.

Chambers, William L., to Minnesota Mining and Manufacturing Company. Treated photoconductive titanium dioxide sheet. 4,187,103, Cl. 430-40.000.

Chambley, Phillip W.; and Norris, Alan H., to WWG Industries, Inc. Packaging of self-twist yarns. 4,186,549, Cl. 57-293.000.

Champion International Corporation: *See*—
Vincent, David N.; and Chang, Cheng-Hsiung, 4,187,193, Cl. 252-316.000.

Chandross, Edwin A.; and Tomlinson, Walter J., III, to Bell Telephone Laboratories, Incorporated. Sensitized porous bodies useful for producing thick refractive index recordings. 4,187,111, Cl. 430-2.000.

Chang, Cheng-Hsiung: *See*—
Vincent, David N.; and Chang, Cheng-Hsiung, 4,187,193, Cl. 252-316.000.

Chapman, John: *See*—
Robinson, Alan V.; and Chapman, John, 4,187,211, Cl. 260-42.440.

Charles, Distel: *See*—
Nissen, Alex; and Charles, Distel, 4,186,619, Cl. 74-414.000.

Chase, Jay V.: *See*—
Lindstrum, Alan L.; and Chase, Jay V., 4,187,491, Cl. 367-125.000.

Chassagne, Pierre J., to Bechtel International Corporation. Coal slurry pipelining. 4,187,044, Cl. 406-197.000.

Chatterley, Samuel: *See*—
Levitt, Charlie M.; and Chatterley, Samuel, 4,186,838, Cl. 209-581.000.

Chem-Trend, Inc.: *See*—
Buyce, Dwight D., 4,186,769, Cl. 137-566.000.

Chen, DeYu, to General Electric Company. High frequency ballast transformer. 4,187,450, Cl. 315-278.000.

Chen, Ho-Sou: *See*—
Billings, Robert L.; Chen, Ho-Sou; Gyorgy, Ernst M.; and Sherwood, Richard C., 4,187,128, Cl. 148-121.000.

Chenel, Pierre; and Moncheaux, Michel, to Saint-Gobain Industries. Apparatus for applying a thick seal to a glass sheet. 4,186,685, Cl. 118-410.000.

Chevron Research Company: *See*—
Anshus, Byron E.; Katsumoto, Kiyoshi; and Serkes, Ira M., 4,187,370, Cl. 528-312.000.
Csicsery, Sigmund M., 4,187,199, Cl. 252-455.00Z.
Katsumoto, Kiyoshi; and Marquis, David M., 4,187,235, Cl. 260-346.750.

Child, Ralph G.; Lang, Stanley A., Jr.; Lee, Ving J.; and Lin, Yang-i, to American Cyanamid Company. Novel dihydrobenzanthracene derivatives. 4,187,373, Cl. 542-402.000.

Children's Hospital Medical Center: *See*—
Lagow, Richard J.; Shimp, Lawrence A.; and Clark, Leland C., Jr., 4,187,252, Cl. 260-653.000.

Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R.T.: *See*—
Takacs, Kalman; Literati, Peter N.; Kiss nee Ajzert, Ilona; Simay, Antal; Szentivanyi, Matyas; Virag, Sandor; and Farago, Katalin, 4,187,220, Cl. 260-239.00B.

Chinook Utility Products, Inc.: *See*—
Brown, Thomas, 4,186,894, Cl. 242-86.600.

Chipens, Gunar I.; Mutulis, Felix K.; and Misinya, Inta P. Bradykinin cyclic analog-cyclo-[(N$^{\epsilon}$-1-L-lysine, 6-glycine)-bradykinin]. 4,187,217, Cl. 260-112.50R.

Choulet, Richard J.; and Mehlman, Stewart K., to Union Carbide Corporation. Method for controlling the temperature of the melt during pneumatic refining of steel. 4,187,102, Cl. 75-60.000.

Christensen, Inc.: *See*—
Aumann, James T., 4,186,569, Cl. 64-23.000.
Jurgens, Rainer, 4,187,061, Cl. 418-48.000.

Christian, Paul T. Truck mountable roadside spray device. 4,186,885, Cl. 239-654.000.

Christoffel, William D., to American Hospital Supply Corporation. Method and apparatus for pulsing a blood flow stimulator. 4,186,732, Cl. 128-24.00R.

Ciba-Geigy Corporation: *See*—
Bernasconi, Raymond; and Ferrini, Pier G., 4,187,234, Cl. 260-346.220.
Darms, Roland; Pfeifer, Josef; and Kvita, Vratislav, 4,187,364, Cl. 526-259.000.
Eckhardt, Claude, 4,187,289, Cl. 424-70.000.
Gschwend, Heinz W.; and Huebner, Charles F., 4,187,313, Cl. 424-278.000.
Immler, Rolf; and Bouvard, Hans, 4,187,304, Cl. 424-249.000.
Immler, Rolf; and Bouvard, Hans, 4,187,305, Cl. 424-249.000.
Karlen, Urs, 4,187,238, Cl. 260-376.000.
Petitpierre, Jean C., 4,187,233, Cl. 260-345.200.
Spivack, John D.; and Dexter, Martin, 4,187,246, Cl. 260-559.00R.
Zinke, Horst; Lorenz, Hans J.; and Linhart, Helmut, 4,187,212, Cl. 260-45.8NT.

Cich, Frank A.: *See*—
Marshall, Richard A.; Smith, Edwin S.; and Cich, Frank A., 4,187,363, Cl. 526-208.000.

Cimon, Denis G.: *See*—
Paris, Gerard Y.; Cimon, Denis G.; Bariana, Dilbagh S.; and Fung, Anthony, 4,187,307, Cl. 424-251.000.

Citelli, Giosue: *See*—
Angioletti, Attilio; and Citelli, Giosue, 4,186,736, Cl. 128-201.190.

Citizen Watch Co., Ltd.: *See*—
Ishigaki, Hisao; Tanaka, Ryuzo; and Nakamima, Koichi, 4,186,552, Cl. 58-88.00W.
Nakayama, Yasuaki, 4,186,551, Cl. 58-23.00R.

Clarenz, Werner: *See*—
Zecher, Wilfried; Clarenz, Werner; Dunwald, Willi; and Merten, Rudolf, 4,187,365, Cl. 528-45.000.

Clark, Leland C., Jr.: *See*—
Lagow, Richard J.; Shimp, Lawrence A.; and Clark, Leland C., Jr., 4,187,252, Cl. 260-653.000.

Clark, William E.; Herb, Carl C.; and Greene, Reginald S., to Carrier Corporation. System powered damper blade assembly for use in an air conditioning system. 4,186,876, Cl. 236-49.000.

Clark, William T., III. Topical Thermograph. 4,186,731, Cl. 128-736.000.

Clausen, Carol W.; and Davis, Eugene J. Armor comprising ballistic fabric and particulate material in a resin matrix. 4,186,648, Cl. 89-36.00A.

Clauss, Robert C.: *See*—
United States of America, National Aeronautics and Space Administration; Clauss, Robert C.; and Quinn, Rex B., 4,187,470, Cl. 330-4.000.

Clifford, Michael L., to Imperial Chemical Industries Limited. Polymerization process. 4,187,278, Cl. 422-132.000.

Coach & Car Equipment Corporation: *See*—
Harder, Arthur J., Jr., 4,186,966, Cl. 297-452.000.

Coal Industry (Patents) Limited: *See*—
Fitchett, Kevin, 4,186,553, Cl. 59-78.100.
Gray, George W., 4,187,523, Cl. 361-30.000.

Coats & Clark, Inc.: *See*—
Schleifstein, Robert, 4,186,466, Cl. 24-205.13C.

Cobaugh, Robert F.; and Coller, James R., to AMP Incorporated. Contact with split portion for engagement with substrate. 4,186,982, Cl. 339-17.00C.

Cobb, Raymond L., to Phillips Petroleum Company. Cyanide-catalyzed isomerization and deuterium exchange with alpha- and beta-sulfolenes. 4,187,231, Cl. 260-332.100.

Cochran, Michael J., to Texas Instruments Incorporated. Electronic phase locked loop circuit. 4,187,473, Cl. 331-8.000.

Cockroft, James B.: *See*—
Ernster, Peter J.; Canamero, Ernest; and Cockroft, James B., 4,187,412, Cl. 219-441.000.

Cohen, Mitchell S.: *See*—
Ahn, Kie Y.; Cohen, Mitchell S.; Powers, John V.; and Tao, Lungjo, 4,187,553, Cl. 365-8.000.

Colburn, Edward N. Keeper pin system for shovel teeth. 4,187,035, Cl. 403-318.000.

Coleman Company, Inc., The: *See*—
Hastings, Thomas C., 4,186,760, Cl. 137-244.000.

Coleman, James P.; and Wagenknecht, John H., to Monsanto Company. Preparation of dihydroaromatic hydrocarbons. 4,187,156, Cl. 204-73.00R.

Coleman, John D. Specialty envelope. 4,186,868, Cl. 229-92.100.

Colgate Palmolive Company: *See*—
Cordon, Martin; and Norfleet, James, 4,187,288, Cl. 424-49.000.
Schreiber, Ronald S.; and Principe, Joseph R., 4,187,287, Cl. 424-49.000.

Colkhi, Inc.: *See*—
Jacobi, Edgar F.; and Madden, Mark R., 4,186,880, Cl. 239-177.000.

Coll, Emory E.: *See*—
Stanonis, David J.; King, Walter D.; and Coll, Emory E., 4,186,608, Cl. 73-437.000.

Coller, James R.: *See*—
Cobaugh, Robert F.; and Coller, James R., 4,186,982, Cl. 339-17.00C.

Collings, Thomas J. Scooter vehicle. 4,186,934, Cl. 280-221.000.

Collum, Paulette: *See*—
Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, 4,187,297, Cl. 424-180.000.

Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, 4,187,298, Cl. 424-180.000.

Combustion Engineering, Inc.: *See—*
Noyes, Richard C.; and Zaman, Shakir U., 4,187,145, Cl. 176-36.00R.

Comex Marine Services, Inc.: *See—*
Billingsley, Lloyd E.; and Latham, Raymond E., 4,186,950, Cl. 285-270.000.

Compagnie Generale d'Electricite: *See—*
Appleby, Anthony J.; and Crepy, Gilles, 4,187,165, Cl. 204-254.000.

Compagnie Generale des Etablissements Michelin: *See—*
Pommier, Jean, 4,186,788, Cl. 152-209.00B.
Verdier, Henri, 4,186,789, Cl. 152-354.00R.

Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Beduchaud, Michel; and de Loye, Martin, 4,187,520, Cl. 358-257.000.

Cone, Richard E. Portable playpen. 4,186,454, Cl. 5-99.00R.

Cone, Richard E., II: *See—*
Farrell, Claude S., Jr.; Cone, Richard E., II; and Ellies, Alan D., 4,186,961, Cl. 297-216.000.

Congoleum Corporation: *See—*
Shortway, Harry A.; Graham, Alan A ; and Miller, Charles H., 4,187,131, Cl. 156-79.000.

Conner, William R., Jr., to Stahl-Urban Company. Apparatus for guiding work through a sewing machine or the like. 4,186,674, Cl. 112-153.000.

Connlab Holdings Limited: *See—*
Micetich, Ronald G.; Fortier, Robert A.; Shaw, Chia C.; and Merlo, Werner O., 4,187,221, Cl. 260-239.00A.

Conoco, Inc.: *See—*
Dodd, John R., 4,187,255, Cl. 585-467.000.
Mack, Mark P., 4,187,158, Cl. 204-159.200.
Radd, Fred J.; Oertle, Don H.; and McKinney, Charles N., 4,187,126, Cl. 148-1.500.

Conquest Manufacturing Co., Inc.: *See—*
Hernandez, Silverio, 4,186,686, Cl. 119-1.000.

Conrad, Sherman E.: *See—*
Wilcox, Richard L.; and Conrad, Sherman E., 4,186,877, Cl. 239-124.000.

Consortium for Elektrochemische Industrie GmbH: *See—*
Deinhammer, Wolfgang; Kaufmann, Rudolf; Braunling, Hermann; and Haberle, Norman, 4,187,237, Cl. 260-347.300.

Constant, James N. Addressable optical computer and filter. 4,187,000, Cl. 350-162.0SF.

Container Corporation of America: *See—*
Zicko, James A., 4,186,866, Cl. 229-17.00B.

Continental Group, Inc., The: *See—*
Bainton, Donald J.; and Mascia, Carmen T., 4,186,485, Cl. 30-410.000.
Walter, John, 4,186,848, Cl. 222-23.000.

Control Data Corporation: *See—*
Kammann, Clarence H., 4,187,554, Cl. 365-15.000.

Coombe, John R.: *See—*
Shen, Ti-Ke; and Coombe, John R., 4,187,146, Cl. 176-37.000.

Cooper, Dean E., to United Technologies Corporation. Redundant flight control system. 4,186,622, Cl. 74-501.00R.

Coppola, Frank T.; Lentz, William P.; and VanDewoestine, Robert V., to Corning Glass Works. Contoured insulation window for evacuated solar collector. 4,186,723, Cl. 126-443.000.

Cordon, Martin; and Norfleet, James, to Colgate Palmolive Company. Modified abrasive system for dentifrices. 4,187,288, Cl. 424-49.000.

Corey, Robert L.; and Ullman, Frederick E., to Unarco Industries, Inc. Roller assembly for package flow systems. 4,186,830, Cl. 193-35.00R.

Cornelius Company, The: *See—*
Fessler, Herman S.; and Tracy, Gene A., 4,187,262, Cl. 261-50.00B.

Corning Glass Works: *See—*
Coppola, Frank T.; Lentz, William P.; and VanDewoestine, Robert V., 4,186,723, Cl. 126-443.000.
Lu, Kun-Er; and Tarcza, Walter H., 4,187,094, Cl. 65-30.00R.
Reade, Richard F., 4,187,115, Cl. 106-39.800.

Cosman, Dieter; and Ruppel, Kathleen C., to Ruppel, Henry W. Boarding ladder and straps. 4,186,820, Cl. 182-93.000.

Costes, Claude, to Union Siderurgique de Nord et du l'est de la France. Device for untightening and tightening nuts. 4,186,629, Cl. 81-53.00R.

Courtois, Alain: *See—*
Huet, Jean P.; and Courtois, Alain, 4,186,911, Cl. 254-93.00R.

Covington, Roger G.; Miller, Stephen H.; and Tucker, Archie J., to Eastman Kodak Company. Container with article positioning element for dispensing reagent coated slides to an automated analyzer. 4,187,077, Cl. 422-63.000.

Covington, Wayne F.: *See—*
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,187,547, Cl. 364-710.000.

Cowan, Frederick C.; and Cowan, Thomas L. Coal burning process. 4,186,669, Cl. 110-347.000.

Cowan, Thomas L.: *See—*
Cowan, Frederick C.; and Cowan, Thomas L., 4,186,669, Cl. 110-347.000.

Cowherd, Frank G., III; and Theiling, Louis F., Jr., to Union Carbide Corporation. Process for producing low color residue acrylate ester monomers. 4,187,382, Cl. 560-185.000.

Cowherd, Frank G., III; and Theiling, Louis F., Jr., to Union Carbide Corporation. Process for producing low color residue acrylate esters. 4,187,383, Cl. 560-224.000.

Cox, Kenneth C. Earth boring machine with crushing rollers. 4,186,808, Cl. 175-334.000.

Cox, Philip P., to Dranetz Engineering Laboratories, Inc. Dynamic threshold impulse directivity indicator. 4,187,461, Cl. 324-102.000.

CPC International Inc.: *See—*
Maher, Thomas K., 4,187,219, Cl. 260-17.4ST.

CPG Products Corp.: *See—*
Kuhn, James O.; Wright, James J.; and Bollinger, Howard N., 4,186,517, Cl. 46-119.000.

CPS, Inc.: *See—*
Wigley, Patrick A.; Dana, Edwin L.; and Pletz, Alfred, Jr., 4,187,535, Cl. 363-16.000.

Cragoe, Edward J., Jr.; Novello, Frederick C.; and Saari, Walfred S., to Merck & Co., Inc. N-alkyl(and cycloalkyl)oxamic acid and derivatives as inhibitors of glycolic acid oxidase. 4,187,315, Cl. 424-305.000.

Crane, Patrick E.; Lazarchik, Robert E.; and Schaufelberger, Arthur H., deceased (by Schaufelberger, Ruth L., administratrix), to Sperry Rand Corporation. Multiple beam antenna array. 4,187,507, Cl. 343-754.000.

Credit Industry Associates, Inc.: *See—*
Jarm, Robert L., 4,186,577, Cl. 70-394.000.

Creekmore, Robert V., to 1st National Bank. Check verification system. 4,187,498, Cl. 340-149.00A.

Crepy, Gilles: *See—*
Appleby, Anthony J.; and Crepy, Gilles, 4,187,165, Cl. 204-254.000.

Criblez, Roger, to Hatebur Umformmaschinen AG. Apparatus for feeding workpieces in a multi-station cross-fed press. 4,186,589, Cl. 72-405.000.

Cronk, Allan D. Pipe joint clamp. 4,186,948, Cl. 285-177.000.

Crooks, Walter, to International Business Machines Corporation. Electrophotographic developing process and compositions for use therein. 4,187,329, Cl. 430-110.000.

Cross, Kenneth R.; and Ewing, Bruce A., to General Motors Corporation. Turbine rotor fabrication by thermal methods. 4,186,473, Cl. 29-156.80R.

Crouzet: *See—*
Jouret, Edouard, 4,186,550, Cl. 58-21.130.

Crown Zellerbach Corporation: *See—*
Reba, Imants, 4,186,860, Cl. 226-91.000.

CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A.: *See—*
Modena, Giulio; Sandri, Stefano; and Scagliola, Carlo, 4,187,397, Cl. 179-1.0SG.

Csicsery, Sigmund M., to Chevron Research Company. Hydrocarbon conversion catalyst. 4,187,199, Cl. 252-455.00Z.

Cummings, Forest M., to Rockwell International Corporation. Grounded RF power amplifier circuit apparatus. 4,187,467, Cl. 325-133.000.

Curtis, Westley F. Transformer movable along power cable. 4,186,663, Cl. 102-18.0MS.

Cusano, Dominic A., to General Electric Company. Structure for collimated scintillation detectors useful in tomography. 4,187,427, Cl. 250-366.000.

Cuthbert, Victor W.: *See—*
Brenner, Robert A.; and Cuthbert, Victor W., 4,186,573, Cl. 68-12.00R.

Cutler, Clifford P.: *See—*
Longsdorf, Ronald W.; and Cutler, Clifford P., 4,186,682, Cl. 116-171.000.

D G Shelter Products Company: *See—*
Carvalho, Elmer R., 4,186,525, Cl. 49-465.000.

Dagani, Michael J.: *See—*
Wiegand, Karl E.; Kao, James T. F.; and Dagani, Michael J., 4,187,230, Cl. 260-326.470.

Dageforde, Allen F., to Rosemount Inc. Electrochemical cell. 4,187,162, Cl. 204-195.00P.

Daimler-Benz Aktiengesellschaft: *See—*
Abthoff, Jorg; Fricker, Ludwig; and Lammer, Jurgen, 4,186,705, Cl. 123-122.0^C.
Bachschmid, Reiner; Gross, Gerlinde; and Strobel, Wolfgang, 4,186,704, Cl. 123-122.0AA.
Bohringer, Karl; Reichle, Peter; and Schwerdt, Paul, 4,186,596, Cl. 73-136.00C.
Lutze, Hans; Weidemann, Dieter; and Weisshappel, Helmut, 4,186,957, Cl. 296-188.000.
Scholz, Hansjurgen; Brambilla, Luigi; and Backhaus, Hans-Gerd, 4,186,941, Cl. 280-743.000.

Dalsin, Bernard L., to Bernard Dalsin Manufacturing Company. Air supply device for fireplaces. 4,186,719, Cl. 126-143.000.

D'Amato, Ralph J.; and Nolan, Richard A., to RCA Corporation. Color picture tube having improved corrugated apertured mask and method of making same. 4,187,443, Cl. 313-402.000.

D'Amico, John J., to Monsanto Company. N-hydrazides of 2-benzothiazolinone as plant growth regulants. 4,187,097, Cl. 71-90.000.

Dana, Edwin L.: *See—*
Wigley, Patrick A.; Dana, Edwin L.; and Pletz, Alfred, Jr., 4,187,535, Cl. 363-16.000.

Danckert, Hermann; Willmann, Michael; and Wundrak, Egon, to Volkswagenwerk Aktiengesellschaft. Sound insulated internal combustion engine. 4,186,714, Cl. 123-195.00C.

Darms, Roland; Pfeifer, Josef; and Kvita, Vratislav, to Ciba-Geigy Corporation. Crosslinkable polymers of unsaturated imides. 4,187,364, Cl. 526-259.000.

Datsenko, Nikolai M.; Pushanko, Nikolai N.; and Yarmilko, Vladimir G. Apparatus for the separation of trash from less heavy firm articles in a flow of liquid. 4,187,172, Cl. 209-44.300.

Dauge, Gilbert V.; and Langlais, Jacques F., to Testut Aequitas. Capacitance measuring by comparison to reference capacitance. 4,187,460, Cl. 324-60.0CD.

d'Auria, Luigi: *See*—
Deman, Pierre; and d'Auria, Luigi, 4,187,404, Cl. 179-100.00R.

Davey Compressor Company: *See*—
Caffrey, Terence, 4,186,767, Cl. 137-501.000.

Davis, Bernard H.: *See*—
Bracalielly, Albert J.; Kautz, Glenn E.; Lindner, Robert G.; and Davis, Bernard H., 4,187,275, Cl. 264-511.000.

Davis, Eugene J.: *See*—
Clausen, Carol W.; and Davis, Eugene J., 4,186,648, Cl. 89-36.00A.

Davis, Thomas T.; and Burk, Marvin C., to Phillips Petroleum Company. Control panel self-test. 4,187,540, Cl. 364-200.000.

Day, Edward G.; and Hollis, Thomas J., Jr., to General Motors Corporation. Exhaust gas recirculation control. 4,186,702, Cl. 123-119.00A.

Dayco Corporation: *See*—
Carey, Richard D., 4,186,778, Cl. 138-103.000.
Massok, Anthony J., Jr.; and Nolan, James P., 4,186,499, Cl. 36-44.000.
Wagner, William T., 4,186,779, Cl. 138-121.000.
White, Jack D., Jr., 4,186,823, Cl. 188-32.000.

Dean, Bob W.: *See*—
Mallory, Lewis B.; and Dean, Bob W., 4,186,655, Cl. 98-1.000.

Dearlove, Thomas J.; Gray, Richard K.; and Atkins, Richard P., to General Motors Corporation. Thermoset imidazole cured epoxy-polysulfide rubber automotive body solder. 4,187,348, Cl. 428-418.000.

Decker, Bert J., deceased; and by Decker, Jean S., executrix. Heat pipe-turbine. 4,186,559, Cl. 60-531.000.

Decker, Jean S., executrix: *See*—
Decker, Bert J., deceased; and Decker, Jean S., executrix, 4,186,559, Cl. 60-531.000.

Deere & Company: *See*—
Black, Robert D.; Hennen, John J.; and Krafka, Jerry L., 4,186,889, Cl. 241-89.200.
Klope, Lawrence R.; and Haight, Robert E., 4,186,777, Cl. 138-31.000.
Nowak, Klaus F.; and Braun, Stephen A., 4,186,819, Cl. 181-265.000.
Pfundstein, Donald K., 4,186,816, Cl. 180-243.000.

Deinhammer, Wolfgang; Kaufmann, Rudolf; Braunling, Hermann; and Haberle, Norman, to Consortium for Elektrochemische Industrie GmbH. Process for the manufacture of a furancarboxylic acid anilide. 4,187,237, Cl. 260-347.300.

DeJackome, Gene E.: *See*—
Kruse, Robert L.; and DeJackome, Gene E., 4,187,260, Cl. 525-263.000.

de Jong, Hendrikus; and Welboren, Joseph A., to Hoogovens Ijmuiden, B. V. Locomotive engine housing arrangement. 4,186,665, Cl. 105-456.000.

Delavan Manufacturing Company: *See*—
Wilcox, Richard L.; and Conrad, Sherman E., 4,186,877, Cl. 239-124.000.

Delignieres, Robert, to Institut Francais du Petrole. Device for determining the relative position of elongate members towed behind a ship. 4,187,492, Cl. 367-127.000.

de Loye, Martin: *See*—
Beduchaud, Michel; and de Loye, Martin, 4,187,520, Cl. 358-257.000.

Deman, Pierre; and d'Auria, Luigi, to Thomson-CSF. Telephone set for optical fibers lines. 4,187,404, Cl. 179-100.00R.

Denki Kagaku Kogyo Kabushiki Kaisha: *See*—
Nakagawa, Koji; and Watanabe, Yoshiharu, 4,187,118, Cl. 106-89.000.

Denkin, Nathan M.; and Runge, Peter K., to Bell Telephone Laboratories, Incorporated. Arrangement for coupling between an electrooptic device and an optical fiber. 4,186,994, Cl. 350-96.170.

de Nora, Vittorio; Spaziante, Placido M.; and Nidola, Antonio, to Diamond Shamrock Technologies S.A. Molten salt electrolysis. 4,187,155, Cl. 204-67.000.

Derbyshire, George C., to Jacobs Manufacturing Co., Ltd., The. Keys for drill chucks. 4,186,933, Cl. 279-1.00K.

Deresh, Ilya A.: *See*—
Shikhirev, Boris N.; Matrosov, Evgeny A.; and Deresh, Ilya A., 4,187,081, Cl. 51-23.000.

DeSoto, Inc.: *See*—
Brook, Richard L., 4,187,347, Cl. 428-375.000.
McLaughlin, Robert L.; and Wood, Donald C., 4,187,190, Cl. 252-99.000.
Murphy, Edward J., 4,187,203, Cl. 260-18.00N.

Detlefs, Harry. Lock strike plate assembly. 4,186,954, Cl. 292-340.000.

Deutsch Company Electronic Components Division, The: *See*—
Holzman, Melvyn A., 4,186,998, Cl. 350-96.210.

Deverell, Christopher: *See*—
Mathews, Carl F.; Deverell, Christopher; Pears, Gordon E. A.; and Knowles, Peter G., 4,187,113, Cl. 430-533.000.

Dewalliens, Leon, to Fabrication Belge de Disques "Fabeldis". Method for manufacturing substantially flat dies. 4,187,154, Cl. 204-5.000.

DeWeese, Eugene R., Jr.; and Marsh, Lynn W., Jr. Key generator. 4,187,393, Cl. 178-22.000.

Dexter, Martin: *See*—
Spivack, John D.; and Dexter, Martin, 4,187,246, Cl. 260-559.00R.

Diamond Shamrock Technologies S.A.: *See*—
de Nora, Vittorio; Spaziante, Placido M.; and Nidola, Antonio, 4,187,155, Cl. 204-67.000.

Dickinson, Richard M.: *See*—
United States of America, National Aeronautics and Space Administration; and Dickinson, Richard M., 4,187,506, Cl. 343-100.00R.

Diener, Rudolf. Carburetor for an internal combustion engine. 4,187,264, Cl. 261-84.000.

Dieterich, Dieter: *See*—
Traubel, Harro; Dieterich, Dieter; and Heinze, Helga, 4,187,074, Cl. 8-94.190.

Dietrich, Ralph N.: *See*—
Robinson, John W.; and Dietrich, Ralph N., 4,186,639, Cl. 84-1.030.

Diggs, Richard E. Directionally controlled array of solar power units. 4,187,123, Cl. 136-206.000.

Dijk, Jan A.; and Hegeman, Everhardus J., to B. V. Weverij Voorheen J. H. Meijerink & Zonen. Method for transversely cutting and hemming a web of fabric. 4,187,132, Cl. 156-88.000.

Dill, Melville R., Jr.: *See*—
Buckley, Albert P.; and Dill, Melville R., Jr., 4,186,841, Cl. 220-6.000.

Di Matteo, Paul L.; Ross, Joseph A.; Stern, Howard K.; and Waszak, Lawrence, to Solid Photography Inc. Arrangement for applying coded illuminated patterns to an object. 4,187,011, Cl. 353-122.000.

Dirsking, Robert S., to Procter & Gamble Company, The. Self-priming passive dosing dispenser. 4,186,856, Cl. 222-424.500.

Dodd, John R., to Conoco, Inc. Process for methylating naphthalene. 4,187,255, Cl. 585-467.000.

Dodt, Jurgen: *See*—
Plevak, Lubomir; and Dodt, Jurgen, 4,187,042, Cl. 405-291.000.

Dold, Berthold, to Kienzle Apparate GmbH. Device for recording vehicle speeds. 4,187,510, Cl. 346-21.000.

Dolezal, Ladislav; Weiss, Frantisek; Stanek, Petr; and Lorenc, Miroslav, to Vyzkumny ustav 070. Apparatus for evaluating deformation characteristics of mechanically tested materials. 4,186,610, Cl. 73-805.000.

Dollard, Walter J.: *See*—
Braun, Howard E.; Dollard, Walter J.; and Tower, Stephen N., 4,187,147, Cl. 176-38.000.

Dominion Auto Accessories Limited: *See*—
Brudy, Otto, 4,186,905, Cl. 248-478.000.

Dominion Engineering Works Limited: *See*—
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Dominion Tool & Die Company, Inc.: *See*—
Domitter, Erich, 4,186,595, Cl. 73-132.000.

Domitter, Erich, to Dominion Tool & Die Company, Inc. Brake testing apparatus. 4,186,595, Cl. 73-132.000.

Donald Enterprises, Inc.: *See*—
Donald, Jack W., 4,186,742, Cl. 128-270.000.

Donald, Jack W., to Donald Enterprises, Inc. Contraceptive-antivenereal disease tampon. 4,186,742, Cl. 128-270.000.

Donald L. Morton & Associates: *See*—
Harrison, William H., 4,186,729, Cl. 128-1.300.

Donaldson Company, Inc.: *See*—
Durre, Reynold F.; and Berven, Richard P., 4,187,091, Cl. 55-499.000.

Donan, David C., Jr., to Waiamea Company, Inc. Mine roof bolt spike chemical dispenser assembly. 4,187,040, Cl. 405-259.000.

Dorfman, Steven R., to Carnival Toys, Inc. Wireless toy musical instrument. 4,186,641, Cl. 84-1.160.

Dotzauer, Ewald: *See*—
Fahrenschon, Franz; Huettl, Heinz; and Dotzauer, Ewald, 4,187,414, Cl. 179-175.30S.

Douglas, George H.: *See*—
Nuss, George W., Jr.; Santora, Norman J.; and Douglas, George H., 4,187,317, Cl. 424-309.000.

Douglas, Robert H.; and Phinney, Thomas L., to Honeywell Inc. Read request selection system for redundant storage. 4,187,538, Cl. 364-200.000.

Dow Chemical Company, The: *See*—
Hutchinson, Loyd B.; and Blanchard, Robert R., 4,187,269, Cl. 264-171.000.
Jones, Giffin D.; and Asperger, Robert G., 4,187,256, Cl. 525-471.000.
McIntyre, James A.; and Phillips, Robert F., 4,187,350, Cl. 429-45.000.
Miller, Dennis P., 4,187,188, Cl. 252-65.000.
Nielsen, Robert C., 4,187,257, Cl. 525-445.000.
Pickelman, Dale M.; Foster, William A.; and Wessling, Ritchie A., 4,187,142, Cl. 162-146.000.

Dow Corning Limited: *See*—
Winnan, Hewart W., 4,187,208, Cl. 260-37.0SB.

Downen, Jim L.: *See*—
Sutliff, Wayne N.; and Downen, Jim L., 4,186,807, Cl. 175-302.000.

Dranetz Engineering Laboratories, Inc.: *See*—
Cox, Philip P., 4,187,461, Cl. 324-102.000.

Dreikorn, Barry A., to Eli Lilly and Company. Rodenticidal N-alkyldiphenylamines. 4,187,318, Cl. 424-330.000.

Drennan, Denis B.: *See*—
Schleicher, Thomas R.; Maylahn, Donald J.; and Drennan, Denis B., 4,186,738, Cl. 128-153.000.

Dressel, Gary A.: *See*—
Bond, James W.; and Dressel, Gary A., 4,187,549, Cl. 364-746.000.

Dresser Industries, Inc.: *See*—
Mercurio, Richard N.; and Graham, Richard B., 4,186,831, Cl. 198-501.000.

Mitchell, Howard E., 4,186,809, Cl. 175-334.000.
Parker, Curtis J.; and McGill, Kenneth H., 4,187,059, Cl. 417-454.000.
Driggers, Vernon J. Fuel economizer system for internal combustion engines. 4,186,707, Cl. 123-139.0AV.
Drkal, Jan: *See—*
Kovar, Jan; Drkal, Jan; Zalesak, Jan; and Hladky, Vaclav, 4,186,583, Cl. 72-108.000.
Du Bae, Hyung, to International Telephone and Telegraph Corporation. Turbine flowmeter. 4,186,603, Cl. 73-231.00R.
DuBois, R. Clark: *See—*
Popiel, Stanley; DuBois, R. Clark; Carley, Jay L.; and Hamma, John C., 4,186,837, Cl. 209-565.000.
Dufaylite Developments Ltd.: *See—*
Thwaites, Peter J.; and Thornton, John N., 4,187,138, Cl. 156-512.000.
Dujardin, Claude: *See—*
Euzen, Jean-Paul; Vuillemot, Daniel; and Dujardin, Claude, 4,187,169, Cl. 208-157.000.
Dungs, Horst: *See—*
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; and Wollenhaupt, Karl-Heinz, 4,187,079, Cl. 44-10.00C.
Dunn, Phillip D.: *See—*
Hug, William F.; Hamerdinger, Randolph W.; Dunn, Phillip D.; and McQuillan, Robert C., 4,187,474, Cl. 331-94.50D.
Dunwald, Willi: *See—*
Zecher, Wilfried; Clarenz, Werner; Dunwald, Willi; and Merten, Rudolf, 4,187,365, Cl. 528-45.000.
Du Pont de Nemours, E. I., and Company: *See—*
Howard, Edward G., Jr., 4,187,210, Cl. 260-42.140.
Durango Systems, Inc.: *See—*
Verstegen, Brian P., 4,187,552, Cl. 364-900.000.
Durre, Reynold F.; and Berven, Richard P., to Donaldson Company, Inc. Pleated paper filter cartridge. 4,187,091, Cl. 55-499.000.
Dworkin, Robert D., to M&T Chemicals Inc. Method for preparing organotin compounds. 4,187,239, Cl. 260-410.600.
Dynex/Rivett, Inc.: *See—*
Patel, Kishor, 4,186,909, Cl. 251-31.000.
Dziewolski, Richard. Rigid joint assembly. 4,187,034, Cl. 403-217.000.
E. R. Squibb & Sons, Inc.: *See—*
Meeks, Marion; and Narra, R. K., 4,187,285, Cl. 424-1.000.
Sprague, Peter W., 4,187,236, Cl. 260-346.220.
Eastman Kodak Company: *See—*
Covington, Roger G.; Miller, Stephen H.; and Tucker, Archie J., 4,187,077, Cl. 422-63.000.
Gardner, Sylvia A.; and Gysling, Henry J., 4,187,240, Cl. 260-429.00R.
Irick, Gether, Jr.; Ownby, James C.; and Wang, Richard H. S., 4,187,213, Cl. 252-402.000.
Irick, Gether, Jr.; Kelly, Charles A.; and Martin, James C., 4,187,229, Cl. 548-260.000.
Willis, Roland G., 4,187,108, Cl. 430-203.000.
Eaton Corporation: *See—*
Holton, Robert J., 4,186,981, Cl. 339-14.00R.
Piber, Earl T., 4,187,420, Cl. 200-321.000.
Richards, Elmer A., 4,186,618, Cl. 74-339.000.
Snow, John P., 4,186,946, Cl. 285-94.000.
Southey, Robert G., 4,186,924, Cl. 273-81.400.
Spellman, Gordon B., 4,187,513, Cl. 357-1.000.
Eaton, John R., to International Computers Limited. Pipelined data processing system with centralized microprogram control. 4,187,539, Cl. 364-200.000.
Eckhardt, Claude, to Ciba-Geigy Corporation. Softening agents containing diester/amine adducts and quaternary ammonium salts, valuable for use as after-rinse softeners and after-shampoo hair conditioners. 4,187,289, Cl. 424-70.000.
Eckhoff, Stephen A.: *See—*
Phoenix, Lancelot; and Eckhoff, Stephen A., 4,186,713, Cl. 123-148.00E.
Ecodyne Corporation: *See—*
Kunin, Robert; and Blaine, Louis I., 4,187,120, Cl. 127-46.00A.
Schwinn, Joseph M.; and Maynard, Tony E., 4,187,056, Cl. 416-207.000.
Edman, Walter W.; and Farer, Irving L., to Zotos International, Inc. Spray pump actuating and bottle holding device. 4,186,855, Cl. 222-321.000.
Edwards, John A., to Syntex (U.S.A.) Inc. 17 Beta-thiocarboxylic acid esters of 6 alpha, 6 beta-difluoro-3-oxoandrost-4-enes. 4,187,301, Cl. 424-241.000.
Efimov, Leonid A., deceased: *See—*
Gorlitsyn, Sergei N.; Kavitsky, Mikhail R.; Koires, Vladimir I.; Efimov, Leonid A., deceased; and Gebler, Iraida I., administratrix, 4,186,588, Cl. 72-394.000.
Egorov, Alexandr F.; Ryzhnev, Vadim J.; Simonovsky, Dmitry K.; and Sokolov, Valery A. Method of determining the quantitative content of gaseous or vaporous impurity in a gas mixture and a device for accomplishing same. 4,186,590, Cl. 73-23.000.
Ehrhardt, Henry B., to Petersen, Larry C.; and Smith, Stanley M. Article for measuring lower extremities comprising laminae of both PVC and acrylic. 4,187,423, Cl. 250-312.000.
Eibe, Werner W., to Blaw-Knox Foundry & Mill Machinery, Inc. Rolling mill gauge and flatness calibration system. 4,186,579, Cl. 72-8.000.
Eirich, Hubert; Eirich, Walter; Eirich, Paul; Hasenhundl, Josef; and Spengler, Adolf. Method of measuring the moisture content in flowable materials and apparatus for carrying out the method. 4,186,592, Cl. 73-73.000.
Eirich, Paul: *See—*
Eirich, Hubert; Eirich, Walter; Eirich, Paul; Hasenhundl, Josef; and Spengler, Adolf, 4,186,592, Cl. 73-73.000.
Eirich, Walter: *See—*
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Eizumi, Hideo: *See—*
Ohara, Isamu; Muranaka, Tsutomu; and Eizumi, Hideo, 4,187,484, Cl. 335-75.000.
Electro Mag Sales: *See—*
Johnson, Joseph R., 4,186,891, Cl. 242-55.19R.
Electro Materials Corporation of America: *See—*
Hilson, David G.; and Tulipan, Peter A., 4,187,201, Cl. 252-512.000.
Eli Lilly and Company: *See—*
Dreikorn, Barry A., 4,187,318, Cl. 424-330.000.
Ellcon-National, Inc.: *See—*
O'Connor, Daniel P., 4,186,953, Cl. 292-210.000.
Ellies, Alan D.: *See—*
Farrell, Claude S., Jr.; Cone, Richard E., II; and Ellies, Alan D., 4,186,961, Cl. 297-216.000.
Ellis, Arthur J.; and Howarth, Alan, to Lucas Industries Limited. Liquid fuel injection pumps. 4,187,060, Cl. 417-490.000.
Elsohly, Mahmoud A.; and Turner, Carlton E., to University of Mississippi, The. Paraquat detection method. 4,187,076, Cl. 23-230.0PC.
Emhardt, Roland; and Wachter, Erich, to Sulzer Brothers Limited. Resilient sealing ring. 4,186,932, Cl. 277-207.00A.
EMI Limited: *See—*
Pearce, Ralph R., 4,186,944, Cl. 283-8.00R.
Emsig Manufacturing Corp.: *See—*
Fischler, Daniel A., 4,187,265, Cl. 264-22.000.
Endo, Syokichi: *See—*
Fujimura, Takasi; and Endo, Syokichi, 4,187,013, Cl. 354-1.000.
Endoh, Kenjiro; Ohkawa, Motokazu; Kitagawa, Kazuo; and Kira, Hideshi, to Tokyo Shibaura Electric Co., Ltd. Noise reduction system. 4,187,477, Cl. 333-14.000.
Endoh, Kenjiro; Ohkawa, Motokazu; Kitagawa, Kazuo; and Kira, Hideshi, to Tokyo Shibaura Electric Co., Ltd. Noise reduction system having specific encoder circuitry. 4,187,478, Cl. 333-14.000.
Ensmann, Burt, to Ideal Toy Corporation. Posable doll. 4,186,516, Cl. 46-107.000.
Entech Corporation: *See—*
McConnellogue, Neal J., 4,186,678, Cl. 113-121.00C.
Erdman, John F. Coat sleeve form. 4,186,444, Cl. 223-72.000.
Erikson, J. Alden; Lewarchik, Ronald J.; and Birkmeyer, William J., to PPG Industries, Inc. Esters of imidazolidinedione-based triepoxides. 4,187,380, Cl. 548-310.000.
Ernster, Peter J.; Canamero, Ernest; and Cockroft, James B., to Sunbeam Corporation. Automatic control for electric heating device. 4,187,412, Cl. 219-441.000.
Eroshkin, Nikolai A.; Ivannikov, Alfred V.; Matveev, Vyacheslav N.; and Sergienko, Anatoly I., to Vsesojuzny Nauchno-Issledovatelsky, Proektno-Konstruktorsky i Tekhnologichesky Institut Elektrosvarochnogo Oborudova. Method of multi-pass narrow groove arc welding. 4,187,410, Cl. 219-137.200.
Escher Wyss Limited: *See—*
Biondetti, Mario, 4,186,472, Cl. 29-113.0AD.
Essex Group, Inc.: *See—*
Robling, Marc E., 4,186,883, Cl. 239-491.000.
Etablissements Zelant, Gazuit, Societe Anonyme: *See—*
Harmant, Michel, 4,186,526, Cl. 51-33.00R.
Etat Francaise: *See—*
Boutmy, Patrick E.; and Camborde, Jean-Marc A., 4,187,415, Cl. 179-175.30F.
Ethyl Corporation: *See—*
Wiegand, Karl E.; Kao, James T. F.; and Dagani, Michael J., 4,187,230, Cl. 260-326.470.
Etienne, Michel, to Automobiles Peugeot. Device for regulating the source of electric energy on a hybrid electric vehicle. 4,187,436, Cl. 290-27.000.
Etoh, Kuniomi; Nanpei, Masaru; and Miyagi, Morio, to Toyobo Co., Ltd. Photosensitive plate containing nitrogen containing condensation type polyesters. 4,187,112, Cl. 430-285.000.
Eue, Ludwig: *See—*
Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., 4,187,100, Cl. 71-92.000.
Seng, Florin; Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., 4,187,101, Cl. 71-92.000.
Euzen, Jean-Paul; Vuillemot, Daniel; and Dujardin, Claude, to Institut Francais du Petrol. Process and apparatus for effecting three-phase catalytic reactions. 4,187,169, Cl. 208-157.000.
Evans, Delme; Jolley, Michael R. J.; Ross, William J.; and Swann, Brian P., to Lilly Industries Limited. Acylamino derivatives. 4,187,232, Cl. 549-69.000.
Evans, Gary E., to Westinghouse Electric Corp. Reflector antenna with plural feeds at focal zone. 4,187,508, Cl. 343-770.000.
Ewing, Bruce A.: *See—*
Cross, Kenneth R.; and Ewing, Bruce A., 4,186,473, Cl. 29-156.80R.
Exxon Production Research Company: *See—*
Jahns, Hans O.; and Maer, Newton K., Jr., 4,187,039, Cl. 405-217.000.
Exxon Research & Engineering Co.: *See—*
Linsenmann, Don R., 4,186,696, Cl. 123-90.610.
McVicker, Gary B., 4,187,168, Cl. 208-139.000.

Fabrication Belge de Disques "Fabeldis": *See*—
Dewallens, Leon, 4,187,154, Cl. 204-5.000.

Fabula, Andrew G.; Green, James H.; and Madison, William F., to United States of America, Navy. Torpedo drag reduction employing polymer ejection. 4,186,679, Cl. 114-20.00R.

Fachbach, Heinz: *See*—
Thien, Gerhard; and Fachbach, Heinz, 4,186,693, Cl. 123-41.120.

Fahrenschon, Franz; Huettl, Heinz; and Dotzauer, Ewald, to Siemens Aktiengesellschaft. Circuit arrangement for an interference data alarm system in communication facilities, particularly in telephone equipment. 4,187,414, Cl. 179-175.30S.

Fahrni, Peter, Dr.: *See*—
Wirz, Walter, 4,186,847, Cl. 222-1.000.

Fainzilberg, Leonid S.: *See*—
Skurikhin, Vladimir I.; Fainzilberg, Leonid S.; and Zhitetsky, Leonid S., 4,187,541, Cl. 364-497.000.

Fairchild Industries, Inc.: *See*—
Marrujo, Ralph G.; and Hire, Thomas D., 4,186,964, Cl. 297-422.000.

Falk Corporation, The: *See*—
Pokrandt, Glenn C., 4,186,570, Cl. 64-28.00R.

Farago, Katalin: *See*—
Takacs, Kalman; Literati, Peter N.; Kiss nee Ajzert, Ilona; Simay, Antal; Szentivanyi, Matyas; Virag, Sandor; and Farago, Katalin, 4,187,220, Cl. 260-239.00B.

Farbshtein, Jury G.: *See*—
Pavlikov, Rudolf Z.; Shorygina, Natalya V.; Strupinsky, Vladimir A.; Kruglikov, Anatoly A.; Farbshtein, Jury G.; and Klipinitser, Iosif L., 4,187,369, Cl. 528-137.000.

Farer, Irving L.: *See*—
Edman, Walter W.; and Farer, Irving L., 4,186,855, Cl. 222-321.000.

Farrell, Claude S., Jr.; Cone, Richard E., II; and Ellies, Alan D., to Buckeye International Inc. Child car seating apparatus and method for assembling the same. 4,186,961, Cl. 297-216.000.

Fauconnet, Michel, to Ateliers des Charmilles, S.A. Hydraulic machine. 4,186,555, Cl. 60-330.000.

Favre, John A.: *See*—
Schaffer, Arnold M.; and Favre, John A., 4,187,026, Cl. 356-326.000.

Fazakerley, Herbert M. Painter's fixture. 4,186,903, Cl. 248-210.000.

Feder, Joseph: *See*—
Tolbert, William R.; and Feder, Joseph, 4,187,149, Cl. 195-104.000.

Feingold, Michael H.: *See*—
Bader, Henry; and Feingold, Michael H., 4,187,225, Cl. 260-239.900.

Feist, Wolfgang M., to Raytheon Company. Method for manufacturing semiconductor structures by anisotropic and isotropic etching. 4,187,125, Cl. 148-1.500.

Fencl, Vernon R.; and Tan, Aujit, to Grotnes Machine Works, Inc. Machine for welding seams in automotive wheel rim blanks. 4,187,406, Cl. 219-59.100.

Ferguson, George R.; and Freeman, Eric D. Irrigation system. 4,186,763, Cl. 137-344.000.

Ferm, Morgan H. O.: *See*—
Rosenberg, Ralf H. S.; and Ferm, Morgan H. O., 4,186,450, Cl. 4-6.000.

Fernandez, Julio A., to National Starch and Chemical Corporation. Gelled nonpigmented wood stains. 4,187,072, Cl. 8-6.500.

Ferranti Limited: *See*—
Nutter, Geoffrey; and McGibbon, William, 4,187,551, Cl. 364-900.000.

Ferrieu, Gilbert M. M., to Telecommunications Radioelectriques et Telephoniques TRT. Time-division multiplex communication system for connecting two-wire line circuits in time-division multiplex. 4,187,400, Cl. 179-15.0AA.

Ferrini, Pier G.: *See*—
Bernasconi, Raymond; and Ferrini, Pier G., 4,187,234, Cl. 260-346.220.

Fessett, Donald J., to Western Gear Corporation. Sequential drive mechanism. 4,186,624, Cl. 74-679.000.

Fessler, Herman S.; and Tracy, Gene A., to Cornelius Company, The. Carbonator and liquid level control. 4,187,262, Cl. 261-50.00B.

Ficker, Walter W.; Lonser, David E.; Rance, William G.; Stricker, Alfred A.; and von Kaenel, Walter, to International Business Machines Corporation. Method and apparatus for locating and aligning flimsy sheets. 4,186,918, Cl. 271-232.000.

Fields, Edison M.: *See*—
Bland, William M., Jr.; and Fields, Edison M., 4,186,872, Cl. 236-34.500.

Figalla, Zdenek: *See*—
Svub, Veroslav; Burian, Milan; Uruba, Vladimir; and Figalla, Zdenek, 4,187,134, Cl. 156-170.000.

Fiore, Russell D.; and Fiore, Russell D. Exerciser for lower leg, ankle, and foot muscles. 4,186,920, Cl. 272-96.000.

Fiore, Russell D.: *See*—
Fiore, Russell D.; and Fiore, Russell D., 4,186,920, Cl. 272-96.000.

Fischer, Artur. Drilling assembly and a drilling tool thereof. 4,187,045, Cl. 408-240.000.

Fischer & Porter Co.: *See*—
Appel, Eggert; Gehrke, Herbert; and Kiene, Wilfried, 4,186,600, Cl. 73-194.0EM.

Fischer, Wilhelm: *See*—
Holst, Arno; Lask, Helmut; Nischwitz, Ehrenfried; and Fischer, Wilhelm, 4,187,342, Cl. 428-283.000.

Fischer, Wulf, to Garching Instrumente. Electrical element of construction. 4,187,161, Cl. 204-195.00S.

Fischler, Daniel A., to Emsig Manufacturing Corp. Method of making ornamental plastic product. 4,187,265, Cl. 264-22.000.

Fish, Darrell D., to Universal Security Instruments, Inc. Portable air compressor. 4,187,058, Cl. 417-234.000.

Fisher, Philip H.; and Ninneman, Lawrence D., to Owens-Illinois, Inc. Laser safety system. 4,187,267, Cl. 264-40.100.

Fitchett, Kevin, to Coal Industry (Patents) Limited. Cable protection equipment. 4,186,553, Cl. 59-78.100.

Fitzner, Arthur O.; and Hager, James R., to Brunswick Corporation. RFI-suppressing ignition system for an internal combustion engine. 4,186,712, Cl. 123-148.0CB.

Fleischmann, Lewis, to Hittman Corporation. Non-invasive, pressure sensor apparatus for communicating pressure inside a body to the exterior thereof. 4,186,751, Cl. 128-748.000.

Flood, Michael G.: *See*—
Henneman, John W.; and Flood, Michael G., 4,186,735, Cl. 128-201.250.

Flynn, Dennis E. Log carrier. 4,186,956, Cl. 294-16.000.

Flynn, Derek J., to Lucas Industries Limited. Control valves for fluids. 4,186,773, Cl. 137-625.300.

FMC Corporation: *See*—
Avramidis, Stellios A.; and Jones, Frederic L., 4,186,617, Cl. 74-245.00S.
Carlson, Ronald H., 4,187,376, Cl. 544-192.000.
Vieau, William J., 4,186,661, Cl. 101-178.000.

Fomichev, Alexandr V.: *See*—
Stakhov, Alexei P.; Vishnyakov, Jury M.; Luzhetsky, Vladimir A.; Ovodenko, Alexandr V.; Solyanichenko, Nikolai A.; and Fomichev, Alexandr V., 4,187,500, Cl. 340-347.0DD.

Fontana, Paul. Greeting card display assembly and method. 4,186,503, Cl. 40-124.400.

Foote, George A.; Lindamood, Mason M.; and Fulcomer, Robert D., to Sola Basic Industries, Inc. Shielded electrical conductor terminations and methods of making same. 4,187,389, Cl. 174-73.00R.

Ford Motor Company: *See*—
Stewart, George W., Jr., 4,186,899, Cl. 244-3.130.

Fortier, Robert A.: *See*—
Micetich, Ronald G.; Fortier, Robert A.; Shaw, Chia C.; and Merlo, Werner O., 4,187,221, Cl. 260-239.00A.

Foster, Edward T.: *See*—
Bruner, A. J.; Foster, Edward T.; and Kearns, Thomas N., 4,186,913, Cl. 256-13.100.

Foster, Lloyd B., to Bootmakers of Sturgeon Bay, Inc., The. Scent dispersing boot. 4,186,502, Cl. 36-136.000.

Foster Wheeler Limited: *See*—
Nickerson, James H. D.; and Steel, Robert R., 4,186,799, Cl. 165-176.000.

Foster, William A.: *See*—
Pickelman, Dale M.; Foster, William A.; and Wessling, Ritchie A., 4,187,142, Cl. 162-146.000.

Fouche, Glynn E., Jr., to M. Lowenstein & Sons, Inc. Process for producing light-reflective fabrics. 4,187,332, Cl. 427-47.000.

Fox, Dana G.: *See*—
Fox, Moroni, Jr.; Fox, Moroni, Sr.; and Fox, Dana G., 4,186,455, Cl. 5-451.000.

Fox, Daniel W. Method of making a tethered ball apparatus. 4,186,921, Cl. 273-26.00E.

Fox, Moroni, Jr.; Fox, Moroni, Sr.; and Fox, Dana G. Composite water bed mattress. 4,186,455, Cl. 5-451.000.

Fox, Moroni, Sr.: *See*—
Fox, Moroni, Jr.; Fox, Moroni, Sr.; and Fox, Dana G., 4,186,455, Cl. 5-451.000.

Foxboro/Trans-Sonics, Inc.: *See*—
Westcott, Vernon C.; and Bowen, John P., 4,187,170, Cl. 209-1.000.

Fraioli, Donato M., to Air Tech Industries Inc. Triple wall panel unit for air supported structure. 4,186,530, Cl. 52-2.000.

Franchenko, Nina A.: *See*—
Grigorenko, Anatoly S.; Moroz, Jury A.; Kortusov, Leonid I.; Kuznetsov, German N.; and Franchenko, Nina A., 4,186,587, Cl. 72-354.000.

Frank Hamachek Machine Company: *See*—
Wallace, John M.; and Pitner, Gerald A., 4,187,545, Cl. 364-559.000.

Frank, Robert G., to PPG Industries, Inc. Method and apparatus for handling glass sheets during shaping and cooling. 4,187,095, Cl. 65-104.000.

Frankfort, Roberta L.; and Madonna, Donna L. Convertible bag apparatus. 4,186,859, Cl. 224-205.000.

Frankl, George, to Lucas Industries Limited. Internal combustion engines. 4,186,560, Cl. 60-599.000.

Franz, John E.; and Howe, Robert K., to Monsanto Company. 3-Aryl-4-isothiazolecarboxylic acid and 3-aryl-4-isoxazolecarboxylic acid derivatives and their use as herbicides. 4,187,099, Cl. 71-90.000.

Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H: *See*—
Theurer, Josef; and Fulser, Karl, 4,186,804, Cl. 171-16.000.

Franzone, Jose S.; and Tamietto, Teresio, to Istituto Biologico Chemioterapico "ABC" S.p.A. Pharmaceutical composition with anti-bronchospasmodic and anti-tussive activity. 4,187,308, Cl. 424-253.000.

Frazita, Richard F., to Hazeltine Corporation. Microstrip network having phase adjustment. 4,187,480, Cl. 333-161.000.

Fredriksson, John I., to Norton Company. Protective silicon nitride or silicon oxynitride coating for porous refractories. 4,187,344, Cl. 428-304.000.

Freeman, Eric D.: *See—*
Ferguson, George R.; and Freeman, Eric D., 4,186,763, Cl. 137-344.000.
Frick, Roger L., to Rosemount Inc. Vortex shedding flowmeter assembly. 4,186,599, Cl. 73-194.0VS.
Fricker, Ludwig: *See—*
Abthoff, Jorg; Fricker, Ludwig; and Lammer, Jurgen, 4,186,705, Cl. 123-122.0AC.
Fridman, Viktor M.: *See—*
Kornilov, Anatoly A.; Petrushkin, Viktor D.; Stetsko, Viktor N.; and Fridman, Viktor M., 4,187,181, Cl. 210-332.000.
Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Hoffmann, Reinhard; Hoffmann, Jurgen; and Hoffmann, Norbert, 4,187,171, Cl. 209-383.000.
Friedericy, Johan A.; Moeller, Dale O.; and Towgood, Dennis A., to Garrett Corporation, The. Multi-rim flywheel attachment. 4,186,623, Cl. 74-572.000.
Friedlander, Charles B.; and McMullen, John C., to PPG Industries, Inc. Amide-modified urethane acrylate radiation curable compounds derived from condensation reaction products of carboxyl and isocyanato groups. 4,187,366, Cl. 528-75.000.
Frischmann, Werner: *See—*
Remberg, Horst; and Frischmann, Werner, 4,186,495, Cl. 34-92.000.
Frommlet, Hubert: *See—*
Schwarz, Alois; Mautz, Karlheinz; and Frommlet, Hubert, 4,186,975, Cl. 308-187.000.
Fryer, Thomas B., to United States of America, National Aeronautics and Space Administration. Induction powered biological radiosonde. 4,186,749, Cl. 128-748.000.
Fuchs, Werner: *See—*
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Fuji Kuuki Kabushiki Kaisha: *See—*
Yoshida, Dan; Onaka, Tatsumi; and Horiuchi, Yasuhiro, 4,187,063, Cl. 418-90.000.
Fuji Photo Film Co., Ltd.: *See—*
Inoue, Eiichi; and Yamaguchi, Takashi, 4,187,424, Cl. 250-315.100.
Suzuki, Masaaki; Suzuki, Osamu; and Akashi, Goro, 4,187,341, Cl. 428-213.000.
Yagihara, Morio; Tanaka, Mitsugu; Hirose, Takeshi; and Aono, Toshiaki, 4,187,110, Cl. 430-544.000.
Yamaguchi, Nobutaka; Fujiyama, Masaaki; and Takayama, Satoru, 4,187,345, Cl. 428-337.000.
Fujimura, Takasi; and Endo, Syokichi, to Hitachi, Ltd. Phosphor screen exposure apparatus. 4,187,013, Cl. 354-1.000.
Fujisawa Pharmaceutical Co., Ltd.: *See—*
Tanaka, Kunihiko; Kurita, Masaru; and Nishiwaki, Osamu, 4,187,374, Cl. 544-28.000.
Fujitsu Limited: *See—*
Shimoji, Yutaka; and Arai, Youichi, 4,187,471, Cl. 330-277.000.
Fujiyama, Masaaki: *See—*
Yamaguchi, Nobutaka; Fujiyama, Masaaki; and Takayama, Satoru, 4,187,345, Cl. 428-337.000.
Fulcomer, Robert D.: *See—*
Foote, George A.; Lindamood, Mason M.; and Fulcomer, Robert D., 4,187,389, Cl. 174-73.00R.
Fuller, Edward N.: *See—*
Porter, Grady T.; Fuller, Edward N.; and Roof, Lewis B., 4,186,607, Cl. 73-422.0GC.
Fulser, Karl: *See—*
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Fung, Anthony: *See—*
Paris, Gerard Y.; Cimon, Denis G.; Bariana, Dilbagh S.; and Fung, Anthony, 4,187,307, Cl. 424-251.000.
Furuhata, Yoshio: *See—*
Megumi, Koichi; Kozuka, Hirotsugu; Kobayashi, Masayoshi; and Furuhata, Yoshio, 4,187,109, Cl. 430-2.000.
G&W Laboratories, Inc.: *See—*
Marcus, Bertram J., 4,187,286, Cl. 424-44.000.
Gaibov, Valery M.: *See—*
Bekbulatov, Ildgam A.; Mamatov, Juldash; Varlamov, Gennady D.; Madaliev, Shavkat; and Gaibov, Valery M., 4,187,368, Cl. 525-503.000.
Gaitan, Edward W. Restraining device for cattle. 4,186,688, Cl. 119-96.000.
GALA, narodni podnik: *See—*
Svub, Veroslav; Burian, Milan; Uruba, Vladimir; and Figalla, Zdenek, 4,187,134, Cl. 156-170.000.
Galanty, William B. Comminutor for sewage flowing in liquids. 4,186,888, Cl. 241-46.060.
Games, John E.: *See—*
Healey, David M.; and Games, John E., 4,187,543, Cl. 364-505.000.
Garbrecht, Kurt; and Hildebrandt, Bernhard, to Siemens Aktiengesellschaft. Device for protection against transmission errors in an information transmission system. 4,187,465, Cl. 325-31.000.
Garching Instrumente: *See—*
Fischer, Wulf, 4,187,161, Cl. 204-195.00S.
Garcia Ramos, Jose J., to Investigacion y Desarrollo de Nuevas Technicas para Automatismo, S.A. (I.D.T.A., S.A.). Multiple parameter processing and programming system. 4,187,550, Cl. 364-900.000.
Gardner, Sylvia A.; and Gysling, Henry J., to Eastman Kodak Company. Process for preparing tellurium(II) materials. 4,187,240, Cl. 260-429.00R.
Garner, Arthur W. B.; and Newbery, John L., to Garner, Arthur Winston Buckton. Cricket bat. 4,186,923, Cl. 273-67.00D.
Garner, Arthur Winston Buckton: *See—*
Garner, Arthur W. B.; and Newbery, John L., 4,186,923, Cl. 273-67.00D.
Garrett Corporation, The: *See—*
Friedericy, Johan A.; Moeller, Dale O.; and Towgood, Dennis A., 4,186,623, Cl. 74-572.000.
Gartner, Jurij; and Seidl, Jiri, to Bayerische Motoren Werke. Intake-tube arrangement for internal combustion engines. 4,186,695, Cl. 123-52.00M.
Gattesco, Giovanni, to Tesa, S.A. Dial measurement gauge. 4,186,492, Cl. 33-147.00T.
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Parmer, Jerome F., 4,187,387, Cl. 174-15.0CA.
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Piesik, Edward T., 4,186,647, Cl. 89-1.800.
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Banucci, Eugene G.; and Olander, Walter K., 4,187,361, Cl. 525-4.000.
Bonnice, Phillip E., 4,186,628, Cl. 76-108.00A.
Chalk, Alan J., 4,187,242, Cl. 260-463.000.
Chen, DeYu, 4,187,450, Cl. 315-278.000.
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Hahn, Thomas M., 4,186,945, Cl. 285-19.000.
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Welch, Robert F.; and Stamm, Russell D., 4,186,612, Cl. 74-10.800.
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Bolles, Charles P., 4,186,709, Cl. 123-146.50A.
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Simpson, George W., Jr., 4,187,191, Cl. 252-143.000.
Zaydel, Wieslaw S., 4,186,645, Cl. 85-83.000.
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Carlson, William L., Jr., 4,186,613, Cl. 74-52.000.
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Gladden, James W., to United States of America, Army. Process for making phase holograms. 4,187,106, Cl. 430-1.000.
Glass, Dwight W., to Keystone Consolidated Industries, Inc. Turn button latch. 4,186,952, Cl. 292-202.000.
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Zehel, Joseph J.; and Kreis, Joseph W., 4,187,417, Cl. 200-254.000.
Godley, William P., to Pitney-Bowes, Inc. Mixer-auger mechanism for xerographic developer compositions. 4,187,030, Cl. 366-319.000.
Goetz, Norbert; Mangold, Dietrich; and Zeeh, Bernd, to BASF Aktiengesellschaft. Manufacture of 2,4-dioxo-oxazolidines. 4,187,227, Cl. 548-226.000.
Goldberg, Leonard J., to United States of America, Navy. Carrier and dispersal mechanism for a microorganic larvicide. 4,187,290, Cl. 424-93.000.
Goldfarb, Adolph E.; Benkoe, Erwin, deceased; and Robinson, Don, to Goldfarb, Adolph E.; and Benkoe, Elisabeth, executrix for the estate of Erwin Benkoe. Competitive toss game. 4,186,925, Cl. 273-389.000.
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Milliken, Paul E., 4,186,825, Cl. 188-196.00R.
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Gordon, Roy G. Non-iridescent glass structures. 4,187,336, Cl. 428-34.000.
Gore, Robert W., to W. L. Gore & Associates, Inc. Porous products and process therefor. 4,187,390, Cl. 174-102.00R.
Gorlitsyn, Sergei N.; Kavitsky, Mikhail R.; Koires, Vladimir I.; Efimov, Leonid A., deceased; and by Gebler, Iraida I., administratrix. Device for feeding auxiliary tools into working zone of press. 4,186,588, Cl. 72-394.000.
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Goswami, Jagadish C.; and Yu, Arthur J., to Stauffer Chemical Company. Process for forming a crosslinked polyvinyl chloride foam and product thereof by means of radiation crosslinking. 4,187,159, Cl. 204-159.170.
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Lee, Peter D., 4,186,943, Cl. 283-7.000.
Graham, Alan A.: *See*—
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Graham, Martin H.: *See*—
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Greer, Everett: *See*—
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Grefco, Inc.: *See*—
Nielsen, Richard B.; and Vogelsang, Charles J., 4,187,174, Cl. 210-32.000.
Greskovich, Charles D.; Klug, Frederic J.; and Pasco, Wayne D., to General Electric Company. Process for making a ceramic article having a dense integral outer barrier layer and a high degree of porosity and crushability characteristics. 4,187,266, Cl. 264-43.000.
Grider, James D. Threading apparatus for a standard engine lathe. 4,186,631, Cl. 82-5.000.
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Needham, Donald G.; and Griffin, Ray D., 4,187,214, Cl. 260-45.9KA.
Grigorenko, Anatoly S.; Moroz, Jury A.; Kortusov, Leonid I.; Kuznetsov, German N.; and Franchenko, Nina A. Forging press. 4,186,587, Cl. 72-354.000.
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Blohm, Thomas R.; Grisar, J. Martin; and Parker, Roger A., 4,187,319, Cl. 424-333.000.
Gritsuk, Lev D.: *See*—
Tseluiko, Jury I.; Kutsykovich, Dorina B.; Shabelnikova, Ljudmila A.; Kholopov, Vladimir P.; Schekin, Nikolai G.; Gritsuk, Lev D.; and Katsenelenbogen, Leonid B., 4,186,798, Cl. 165-147.000.
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Gross, Benjamin; Jacob, Solomon M.; Nace, Donald M.; and Voltz, Sterling E., to Mobil Oil Corporation. Simulation of catalytic cracking process. 4,187,548, Cl. 364-578.000.
Gross, Gerlinde: *See*—
Bachschmid, Reiner; Gross, Gerlinde; and Strobel, Wolfgang, 4,186,704, Cl. 123-122.0AA.
Gross, Glenn, to Norlin Industries, Inc. Programmable circuits for electronic musical instruments. 4,186,642, Cl. 84-1.240.
Gross, Leo; and Skeist, Merrill S. Screw-in fluorescent lamp with magnetic arc spreading. 4,187,446, Cl. 315-58.000.
Grotnes Machine Works, Inc.: *See*—
Fencl, Vernon R.; and Tan, Aujit, 4,187,406, Cl. 219-59.100.
Grun, Helmut, to Alkem GmbH. Device for introducing a force-transmitting machine element into a vessel. 4,186,974, Cl. 308-15.000.
Gschwend, Heinz W.; and Huebner, Charles F., to Ciba-Geigy Corporation. 2-Aminoethyl-1,4-benzodioxans. 4,187,313, Cl. 424-278.000.
GTE Automatic Electric Laboratories Incorporated: *See*—
Koppensteiner, James V.; Jameel, Khaja M.; Kubik, Charles K.; and Len, George, 4,186,482, Cl. 29-622.000.
GTE Sylvania Far East Limited: *See*—
Kao, Lin, 4,187,468, Cl. 325-396.000.
Guarnieri, Carmine. Quick-release system for mounting a faucet assembly. 4,186,761, Cl. 137-315.000.
Gueguin, Michel, to Quebec Iron and Titanium Corporation - fer et Titane du Quebec, Inc. Titanium slag-coke granules suitable for fluid bed chlorination. 4,187,117, Cl. 106-56.000.
Guerra, Humberto R. Dental finishing strips. 4,187,082, Cl. 51-295.000.
Guerra, Luis A. Device for taking blood and for injecting medication. 4,186,752, Cl. 128-766.000.
Guerra, Romeo E. Method and apparatus for regulating intravenous flow of a liquid. 4,186,740, Cl. 128-214.00R.
Gulf Oil Corporation: *See*—
Patel, Natu R., 4,187,098, Cl. 71-90.000.
Gulf Research and Development Company: *See*—
Madgavkar, Ajay M.; Vogel, Roger F.; and Swift, Harold E., 4,186,801, Cl. 166-256.000.
Gulf & Western Manufacturing Company: *See*—
Spanke, Edwin A., 4,186,827, Cl. 192-18.00A.
Gutris, Giorgio. Process for manufacturing rotors for in-out electric motors. 4,186,479, Cl. 29-598.000.
Guttinger, Manfred; and Schermutzki, Konrad, to Sandco Limited. Dual-belt cooling system. 4,186,797, Cl. 165-120.000.
Gyorgy, Ernst M.: *See*—
Billings, Robert L.; Chen, Ho-Sou; Gyorgy, Ernst M.; and Sherwood, Richard C., 4,187,128, Cl. 148-121.000.
Gysling, Henry J.: *See*—
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H-G Toys, Inc.: *See*—
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H. H. Robertson Company: *See*—
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Kautz, Glenn E., 4,187,130, Cl. 156-42.000.
H & S Industries, Inc.: *See*—
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Haberle, Norman: *See*—
Deinhammer, Wolfgang; Kaufmann, Rudolf; Braunling, Hermann; and Haberle, Norman, 4,187,237, Cl. 260-347.300.
Hafke, Carl; Weber, Roland; and Kohlen, Rudolf, to Metallgesellschaft Aktiengesellschaft. Treating condensate from gasification of coal. 4,187,080, Cl. 48-202.000.
Hagen, Magnus F. Linearly movable stabilizer for slidable structures. 4,186,972, Cl. 308-3.800.
Hager, James R.: *See*—
Fitzner, Arthur O.; and Hager, James R., 4,186,712, Cl. 123-148.0CB.
Hagner, Mats. Method and apparatus for sowing forest seeds in the humus layer. 4,186,670, Cl. 111-1.000.

Hahn, Thomas M., to General Electric Company. Transition sleeve for a cabinet or the like. 4,186,945, Cl. 285-19.000.
Haight, Robert E.: *See*—
Klope, Lawrence R.; and Haight, Robert E., 4,186,777, Cl. 138-31.000.
Haka, Raymond J.; and Stoltman, Donald D., to General Motors Corporation. Exhaust gas recirculation control. 4,186,703, Cl. 123-119.00A.
Haker, Edwin J.; Riddle, Charles F.; and Bielinski, Ralph F., to Rexnord Inc. Vibration control for asphalt roadway compactor. 4,187,036, Cl. 404-117.000.
Haker, Rolf; Schrader, Klaus; and Thiery, Joachim, to Labora Mannheim GmbH fur Labortechnik. Electronic system for determining blood sedimentation rate using a continually retuned resonant circuit. 4,187,462, Cl. 324-204.000.
Halcon Research & Development Corporation: *See*—
Peltzman, Alan; and Yang, Charles C., 4,187,153, Cl. 203-81.000.
Hall, Bradley G.: *See*—
Hall, Gwendolyn L.; and Hall, Bradley G., 4,186,739, Cl. 128-158.000.
Hall, Gwendolyn L.; and Hall, Bradley G. Athletic garment. 4,186,739, Cl. 128-158.000.
Halliburton Company: *See*—
Scott, David G., 4,186,654, Cl. 92-78.000.
Hallmark Cards, Incorporated: *See*—
Longsdorf, Ronald W.; and Cutler, Clifford P., 4,186,682, Cl. 116-171.000.
Hamane, Tokuhito; Kinoshita Toshio; and Kihira, Masafumi, to Matsushita Electric Industrial Co., Ltd. Method of manufacturing stators for electrical machines or the like and apparatus employed therefor. 4,186,478, Cl. 29-596.000.
Hamerdinger, Randolph W.: *See*—
Hug, William F.; Hamerdinger, Randolph W.; Dunn, Phillip D.; and McQuillan, Robert C., 4,187,474, Cl. 331-94.50D.
Hamlin, Fred A. Force and distance multiplying oblique leverage transmission. 4,186,614, Cl. 74-63.000.
Hamma, John C.: *See*—
Popiel, Stanley; DuBois, R. Clark; Carley, Jay L.; and Hamma, John C., 4,186,837, Cl. 209-565.000.
Hampton, William C. Submersible fishing lamp assembly. 4,187,533, Cl. 362-257.000.
Hanazono Kogu Kabushiki Kaisha: *See*—
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Handleman, Avrom R. Eductor-mixer system. 4,186,772, Cl. 137-604.000.
Hanning, Bernard W. Apparatus for producing sweet water. 4,187,151, Cl. 202-185.00R.
Hans Kolb GmbH & Co.: *See*—
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Harada, Hideki; and Yamashita, Keitarou, to Hitachi Metals, Ltd. Electrostatic developing method and apparatus using conductive magnetic toner. 4,187,330, Cl. 430-103.000.
Haraszti, Jozsef: *See*—
Bartha, Zoltan; Szor, Peter; and Haraszti, Jozsef, 4,186,949, Cl. 285-226.000.
Harder, Arthur J., Jr., to Coach & Car Equipment Corporation. Metal seat frame with adhesively secured exterior plastic parts. 4,186,966, Cl. 297-452.000.
Hardin, George T., to Robertshaw Controls Company. Control device mounting means and parts therefor. 4,186,762, Cl. 137-343.000.
Hardtmann, Goetz E., to Sandoz, Inc. 4-Hydroxy-2-quinolinone-3-carboxylic acids and salts thereof. 4,187,309, Cl. 424-258.000.
Harless, Orville F.: *See*—
Howell, Steven G.; and Harless, Orville F., 4,187,497, Cl. 340-65.000.
Harmant, Michel, to Etablissements Zelant, Gazuit, Societe Anonyme, 20 Robert Osann World Trade Center Ste. 9768 New York, N. Y. 10048. High-sensitivity control-system for ironwork grinders. 4,186,526, Cl. 51-33.00R.
Harmer, Alan L., to Battelle Memorial Institute. Device for producing a light signal corresponding to the refractive index of a fluid. 4,187,025, Cl. 356-133.000.
Harmon, William M.; Holtzmeier, Lindell R.; and Yamamoto, Toshiaki, to United McGill Corporation. Interlocking modular building panel with sealing strip. 4,186,539, Cl. 52-580.000.
Harms, John F. Electrically grounded filter plate. 4,187,179, Cl. 210-238.000.
Harpole, George B. Sail assembly. 4,186,680, Cl. 114-103.000.
Harris Corporation: *See*—
Luhowy, Gabriel J., 4,187,396, Cl. 179-1.0SC.
Palmatier, Roland T.; and Sciulli, Francis J., 4,187,435, Cl. 250-559.000.
Harris, Richard C. Combination pedestrian sign and push button. 4,187,418, Cl. 200-295.000.
Harrison, William H., to Donald L. Morton & Associates. Deep heating electrode. 4,186,729, Cl. 128-1.300.
Hart, Cullen P., to Caterpillar Tractor Co. Motor grader roadwheel arrangement. 4,186,814, Cl. 180-24.000.
Hart, Cullen P., to Caterpillar Tractor Co. Suspension and drive for tandem wheel vehicle. 4,186,815, Cl. 180-41.000.
Hartman, Robert J.: *See*—
Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,187,357, Cl. 521-159.000.
Harwood, Robert G.; and Bowen, Terry P., to AMP Incorporated. Connector ferrule for terminating optical fiber cables. 4,186,999, Cl. 350-96.210.
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Higashide, Eiji; Asai, Mitsuko; and Hasegawa, Toru, 4,187,292, Cl. 424-122.000.
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Hassall, Cedric H.; Johnson, William H.; and Roberts, Noel A., to Hoffmann-La Roche Inc. Dipeptide derivatives. 4,187,216, Cl. 260-112.50R.
Hastings, Thomas C., to Coleman Company, Inc., The. Fuel control assembly for burners. 4,186,760, Cl. 137-244.000.
Hata, Yoshitaka: *See*—
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Hatae, Masataka: *See*—
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Hatano, Yoshio; Nonogaki, Saburo; Horigome, Shinkichi; and Sugawara, Shungo, to Nippon Telegraph and Telephone Public Corporation; and Hitachi, Ltd. Radiation-sensitive composition. 4,187,205, Cl. 260-30.40A.
Hatch, Gary L., to Aqua-Chem, Inc. Mixed-form polyhalide resins for disinfecting water. 4,187,183, Cl. 210-501.000.
Hatebur Umformmaschinen AG: *See*—
Criblez, Roger, 4,186,589, Cl. 72-405.000.
Hauni-Werke Korber & Co. KG: *See*—
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Hauser, Raimund: *See*—
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Hausermann Abrading Process Company: *See*—
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Hausermann, Elmer P.: *See*—
Hausermann, Marten C.; and Hausermann, Elmer P., 4,186,527, Cl. 51-58.000.
Hausermann, Marten C.; and Hausermann, Elmer P., to Hausermann Abrading Process Company. Apparatus for shaping electrodes. 4,186,527, Cl. 51-58.000.
Havlik, Jaroslav; and Hodges, William E. Method and apparatus for the extraction and recovery of hydrocarbons from petroleum bearing materials. 4,187,167, Cl. 208-8.00R.
Hazeltine Corporation: *See*—
Frazita, Richard F., 4,187,480, Cl. 333-161.000.
Healey, David M.; and Games, John E., to United Technologies Corporation. Temperature control of chill water and steam in heating, ventilation, air conditioning (HVAC) systems. 4,187,543, Cl. 364-505.000.
Heffernan, James P.; Sheldon, Loren B.; Tomashek, James R.; and Ward, Donald H., to B. J. Hughes Inc. Computer-controlled oil drilling rig having drawworks motor and brake control arrangement. 4,187,546, Cl. 364-565.000.
Hegeman, Everhardus J.: *See*—
Dijk, Jan A.; and Hegeman, Everhardus J., 4,187,132, Cl. 156-88.000.
Heile, Robert F., to Union Carbide Corporation. Method for laser seam welding of moving workpieces. 4,187,408, Cl. 219-121.0LM.
Heinze, Helga: *See*—
Traubel, Harro; Dieterich, Dieter; and Heinze, Helga, 4,187,074, Cl. 8-94.190.
Heinze, Klaus D.; and Lange, Gerhard, to Siemens Aktiengesellschaft. Gas-Discharge surge arrester with concentric electrodes. 4,187,526, Cl. 361-120.000.
Heise, Arend: *See*—
Mayer, Karl H.; Heitzer, Helmut; Hoffmeister, Friedrich; Heise, Arend; and Kazda, Stanislav, 4,187,306, Cl. 424-251.000.
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Helms, Walter C., Jr. Collapsible coat hanger. 4,186,857, Cl. 223-94.000.
Henkel Kommanditgesellschaft auf Atkien: *See*—
Herold, Claus-Peter; Grodau, Dieter; and Altenschopfer, Theodor, 4,187,121, Cl. 134-26.000.
Henneman, John W.; and Flood, Michael G. Breathing apparatus. 4,186,735, Cl. 128-201.250.
Hennen, John J.: *See*—
Black, Robert D.; Hennen, John J.; and Krafka, Jerry L., 4,186,889, Cl. 241-89.200.
Henry Ford Hospital: *See*—
Toledo-Pereyra, Luis H., 4,186,565, Cl. 62-306.000.
Heppner, John D.: *See*—
Alexander, John T.; and Heppner, John D., 4,186,689, Cl. 119-102.000.
Hepworth, Paul; and Ripley, Ian S., to Imperial Chemical Industries Limited. Synthetic resins derived from petroleum. 4,187,362, Cl. 526-73.000.
Hepworth, Walter: *See*—
Brittain, David R.; Brown, Edward D.; Hepworth, Walter; and Stacey, Gilbert J., 4,187,310, Cl. 424-258.000.
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Clark, William E.; Herb, Carl C.; and Greene, Reginald S., 4,186,876, Cl. 236-49.000.

Herchenbach, Horst: *See—*
Brachthauser, Kunibert; Ramesohl, Hubert; Beisner, Klaus; and Herchenbach, Horst, 4,187,071, Cl. 432-106.000.
Hercules Incorporated: *See—*
Kim, Charles W.; Liu, Chia-Seng; and MacDuff, Richard, 4,186,781, Cl. 139-420.00R.
Hergeth, Herbert, to Hergeth KG. Maschinenfabrik und Apparatebau. Method of opening bales. 4,187,052, Cl. 414-786.000.
Hergeth KG. Maschinenfabrik und Apparatebau: *See—*
Hergeth, Herbert, 4,187,052, Cl. 414-786.000.
Hernandez, Silverio, to Conquest Manufacturing Co., Inc. Prosthetic spur for fighting cocks. 4,186,686, Cl. 119-1.000.
Herold, Claus-Peter; Grodau, Dieter; and Altenschopfer, Theodor, to Henkel Kommanditgesellschaft auf Atkien. Clear-rinse agent for mechanical dishwashers. 4,187,121, Cl. 134-26.000.
Heruth, Kenneth T.: *See—*
Valenta, James D.; and Heruth, Kenneth T., 4,186,737, Cl. 128-203.280.
Hettche, Albert: *See—*
Patsch, Manfred; and Hettche, Albert, 4,187,226, Cl. 260-239.800.
Hewlett-Packard Company: *See—*
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,187,547, Cl. 364-710.000.
Hewson, Robert G., Jr. Stereo sound recording and reproduction apparatus. 4,187,395, Cl. 179-1.0GA.
Higami, Masanobu. Hose connecting mouthpiece. 4,186,910, Cl. 251-149.600.
Higashide, Eiji; Asai, Mitsuko; and Hasegawa, Toru, to Takeda Chemical Industries, Ltd. Antibiotics produced from the microorganism nocardice. 4,187,292, Cl. 424-122.000.
Higgins, Bobby: *See—*
Leslie, Elmer N.; Higgins, Bobby; and Huff, Joe T., 4,186,632, Cl. 83-13.000.
Hildebrandt, Bernhard: *See—*
Garbrecht, Kurt; and Hildebrandt, Bernhard, 4,187,465, Cl. 325-31.000.
Hill, Owen F.: *See—*
Brice, John C.; Hill, Owen F.; and Pratt, Ronald G., 4,187,139, Cl. 156-600.000.
Hilson, David G.; and Tulipan, Peter A., to Electro Materials Corporation of America. Thick film conductors. 4,187,201, Cl. 252-512.000.
Hine, Louis P., to Westinghouse Electric Corp. Method of making heat exchanger coil. 4,186,474, Cl. 29-157.30A.
Hire, Thomas D.: *See—*
Marrujo, Ralph G.; and Hire, Thomas D., 4,186,964, Cl. 297-422.000.
Hirose, Takeshi: *See—*
Yagihara, Morio; Tanaka, Mitsugu; Hirose, Takeshi; and Aono, Toshiaki, 4,187,110, Cl. 430-544.000.
Hishida, Tadanori: *See—*
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Hitachi, Ltd.: *See—*
Fujimura, Takasi; and Endo, Syokichi, 4,187,013, Cl. 354-1.000.
Hatano, Yoshio; Nonogaki, Saburo; Horigome, Shinkichi; and Sugawara, Shungo, 4,187,205, Cl. 260-30.40A.
Ishimaru, Yasuo; Kobayashi, Hiroshi; and Tamura, Junji, 4,186,864, Cl. 228-226.000.
Ishizuka, Kohei; Takasaki, Yoshitaka; Kita, Yasuhiro; Nagoya, Yoshinori; and Kusama, Takeo, 4,187,479, Cl. 333-28.00R.
Kanemaru, Kenji; and Iwasaki, Takashiroh, 4,187,018, Cl. 354-266.000.
Matsuda, Shimpei; Kato, Akira; Uno, Shigeo; and Nakajima, Fumito, 4,187,282, Cl. 423-244.000.
Megumi, Koichi; Kozuka, Hirotsugu; Kobayashi, Masayoshi; and Furuhata, Yoshio, 4,187,109, Cl. 430-2.000.
Noguchi, Takaharu; Ketori, Takao; Tamura, Kohji; Oi, Tetsu; and Miyoshi, Yutaka, 4,186,481, Cl. 29-603.000.
Shinkawa, Keiro; Shoyama, Hiroji; and Sodeyama, Chuichi, 4,187,476, Cl. 331-117.00D.
Ueyama, Takehiko; Nishizawa, Masahiro; Yamazaki, Eiichi; and Ogura, Iwao, 4,187,012, Cl. 354-1.000.
Hitachi Medical Corporation: *See—*
Tomita, Chuji; and Abe, Hiroshi, 4,187,429, Cl. 250-445.00T.
Hitachi Metals, Ltd.: *See—*
Harada, Hideki; and Yamashita, Keitarou, 4,187,330, Cl. 430-103.000.
Monden, Souhei; and Takimoto, Sadaharu, 4,186,567, Cl. 63-14.00R.
Hitachi Zosen Kabushiki Kaisha: *See—*
Yoshida, Dan; Onaka, Tatsumi; and Horiuchi, Yasuhiro, 4,187,063, Cl. 418-90.000.
Hittman Corporation: *See—*
Fleischmann, Lewis, 4,186,751, Cl. 128-748.000.
Hiyoshi, Teruo; Nakada, Akira; Uchiyama, Yasuji; Yamaga, Eiichi; and Aoki, Eiichiro, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument. 4,186,640, Cl. 84-1.030.
Hladky, Vaclav: *See—*
Kovar, Jan; Drkal, Jan; Zalesak, Jan; and Hladky, Vaclav, 4,186,583, Cl. 72-108.000.
Hobbs, Walter V., to Ranco Incorporated. Bellows assembly and method of making the same. 4,186,653, Cl. 92-34.000.
Hobson, John A.; and Schilling, Paul K., to H & S Industries, Inc. Apparatus for the preparation of display blocks of urea formaldehyde foam. 4,187,066, Cl. 425-327.000.
Hodges, Joseph L.: *See—*
Wassmer, Norman B.; and Hodges, Joseph L., 4,186,836, Cl. 209-565.000.
Hodges, William E.: *See—*
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Hodgson, Robert A., to Maloney-Crawford Corporation. Down flow centrifugal separator. 4,187,088, Cl. 55-169.000.
Hodgson, Robert A., to Maloney-Crawford Tank Corporation. Horizontal vapor-liquid separator. 4,187,089, Cl. 55-219.000.
Hoechst Aktiengesellschaft: *See—*
Holst, Arno; Lask, Helmut; Nischwitz, Ehrenfried; and Fischer, Wilhelm, 4,187,342, Cl. 428-283.000.
Puschner, Herbert A.; and Lembens, Helmut, 4,187,405, Cl. 219-10.55A.
Hofer, Otto, to Interondo AG. Box for ampoules having a packaging insert that provides a closure arrangement and reinforcement. 4,186,835, Cl. 206-443.000.
Hoffman-La Roche Inc.: *See—*
Townsend, John M.; and Valentine, Donald H., Jr., 4,187,241, Cl. 260-438.100.
Hoffmann, Jurgen: *See—*
Hoffmann, Reinhard; Hoffmann, Jurgen; and Hoffmann, Norbert, 4,187,171, Cl. 209-383.000.
Hoffmann-La Roche Inc.: *See—*
Bollag, Werner; Ruegg, Rudolf; and Ryser, Gottlieb, 4,187,247, Cl. 260-574.000.
Hassall, Cedric H.; Johnson, William H.; and Roberts, Noel A., 4,187,216, Cl. 260-112.50R.
Holland, George W.; Jernow, Jane L.; and Rosen, Perry, 4,187,381, Cl. 560-121.000.
Hromatka, Otto; Binder, Dieter; Zeller, Paul; and Pfister, Rudolf, 4,187,303, Cl. 424-246.000.
Josse, Rene; and Klaui, Heinrich, 4,187,322, Cl. 426-72.000.
Hoffmann, Norbert: *See—*
Hoffmann, Reinhard; Hoffmann, Jurgen; and Hoffmann, Norbert, 4,187,171, Cl. 209-383.000.
Hoffmann, Reinhard; Hoffmann, Jurgen; and Hoffmann, Norbert, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Sifting machine. 4,187,171, Cl. 209-383.000.
Hoffmeister, Friedrich: *See—*
Mayer, Karl H.; Heitzer, Helmut; Hoffmeister, Friedrich; Heise, Arend; and Kazda, Stanislav, 4,187,306, Cl. 424-251.000.
Hoge, Henry H.: *See—*
Kovens, Michael L.; and Hoge, Henry H., 4,187,496, Cl. 340-63.000.
Hohnjec, Marijan; and Japelj, Miha, to KRKA, Farmaceutika, Kemija, Kozmetika, zdravilisca in gostinstuo, Novo mesto, n.sd.o. Process for the resolution of racemic alpha-aminonitriles. 4,187,244, Cl. 260-465.00E.
Holden, Kenneth G.; and Yim, Nelson C., to SmithKline Corporation. Substituted furyl-2,3,4,5-tetrahydro-1H-3-benzazepine compounds and pharmaceutical use. 4,187,314, Cl. 424-282.000.
Holland, George W.; Jernow, Jane L.; and Rosen, Perry, to Hoffmann-La Roche Inc. 16-Substituted prostaglandins. 4,187,381, Cl. 560-121.000.
Hollis, Thomas J., Jr.: *See—*
Day, Edward G.; and Hollis, Thomas J., Jr., 4,186,702, Cl. 123-119.00A.
Holmes, Roy L.: *See—*
Yiu, Joseph T.; Lea, Jeffrey G.; and Holmes, Roy L., 4,187,464, Cl. 325-470.000.
Holst, Arno; Lask, Helmut; Nischwitz, Ehrenfried; and Fischer, Wilhelm, to Hoechst Aktiengesellschaft. Bonded fiber web, which is capable of absorbing water vapor comprising a swellable cellulose ether in fiber form. 4,187,342, Cl. 428-283.000.
Holton, Robert J., to Eaton Corporation. Grounding device. 4,186,981, Cl. 339-14.00R.
Holtzmeier, Lindell R.: *See—*
Harmon, William M.; Holtzmeier, Lindell R.; and Yamamoto, Toshiaki, 4,186,539, Cl. 52-580.000.
Holzman, Melvyn A., to Deutsch Company Electronic Components Division, The. Optical interconnecting device having tapered surfaces. 4,186,998, Cl. 350-96.210.
Homan, Virginia L. Gift wrapping storage container. 4,186,833, Cl. 206-225.000.
Home Craftsman Company, Inc.: *See—*
Hooks, Jimmy W., 4,186,522, Cl. 49-63.000.
Homma, Kenichiro, legal representative: *See—*
Homma, Kokichi, deceased; and Kameyama, Yoshio, 4,187,107, Cl. 430-252.000.
Homma, Kokichi, deceased (by Homma, Kenichiro, legal representative); and Kameyama, Yoshio, to Toppan Printing Co., Ltd. Making gravure plate with tint screen. 4,187,107, Cl. 430-252.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
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Honeywell Inc.: *See—*
Douglas, Robert H.; and Phinney, Thomas L., 4,187,538, Cl. 364-200.000.
Honickman, Reuben. Wall unit. 4,186,666, Cl. 108-29.000.
Hoogovens Ijmuiden, B. V.: *See—*
de Jong, Hendrikus; and Welboren, Joseph A., 4,186,665, Cl. 105-456.000.

Hooker Chemicals & Plastics Corp.: *See*—
Salee, Gideon, 4,187,259, Cl. 525-219.000.
Hooks, Jimmy W., to Home Craftsman Company, Inc. Storm window frame. 4,186,522, Cl. 49-63.000.
Hoover Universal, Inc.: *See*—
Mizelle, Ned W., 4,186,960, Cl. 297-63.000.
Horie, Kunihiro: *See*—
Mizuno, Haruyuki; Idemoto, Atsushi; and Horie, Kunihiro, 4,187,067, Cl. 425-313.000.
Horigome, Shinkichi: *See*—
Hatano, Yoshio; Nonogaki, Saburo; Horigome, Shinkichi; and Sugawara, Shungo, 4,187,205, Cl. 260-30.40A.
Horiuchi, Yasuhiro: *See*—
Yoshida, Dan; Onaka, Tatsumi; and Horiuchi, Yasuhiro, 4,187,063, Cl. 418-90.000.
Horizons Research Incorporated: *See*—
Wainer, Eugene; and Lewis, James M., 4,187,105, Cl. 430-336.000.
Horvath, Eduard, to Otto Bock Orthopadische Industrie KG. Swivel joint. 4,186,449, Cl. 3-2.000.
Houston, John M., to General Electric Company. Solenoidal electric field lamp with reduced electromagnetic interference. 4,187,445, Cl. 315-54.000.
Houze, Michel: *See*—
Offenstadt, Eric; and Houze, Michel, 4,186,936, Cl. 280-277.000.
Houzeaux, Jean-Pierre: *See*—
Bujadoux, Karel; Neyer, Jean-Marie; and Houzeaux, Jean-Pierre, 4,187,254, Cl. 260-665.00G.
Howald, Arthur M., to Shakespeare Company. Line guide for fishing rod. 4,186,508, Cl. 43-24.000.
Howard, Edward G., Jr., to Du Pont de Nemours, E. I., and Company. Homogeneous, highly-filled, polyolefin composites. 4,187,210, Cl. 260-42.140.
Howard, Jerald D., to Pactra Industries, Inc. Water-restricted, water-soluble paint. 4,187,204, Cl. 260-22.0CB.
Howarth, Alan: *See*—
Ellis, Arthur J.; and Howarth, Alan, 4,187,060, Cl. 417-490.000.
Howe, Robert K.: *See*—
Franz, John E.; and Howe, Robert K., 4,187,099, Cl. 71-90.000.
Howell, Steven G.; and Harless, Orville F. Portable vehicle alarm system. 4,187,497, Cl. 340-65.000.
Hromatka, Otto; Binder, Dieter; Zeller, Paul; and Pfister, Rudolf, to Hoffmann-La Roche Inc. Thiazine derivatives. 4,187,303, Cl. 424-246.000.
Hsioh-Lien Ma, William, to International Business Machines Corp. Fluorine plasma resist image hardening. 4,187,331, Cl. 430-328.000.
Huang, Barney K. Fluid injection soil opener for planters. 4,186,671, Cl. 111-2.000.
Huber, Paul; Schiessl, Alois; and Krone, Hartmut. Smoke projectile charge and process for its manufacture. 4,186,664, Cl. 102-66.000.
Huebner, Charles F.: *See*—
Gschwend, Heinz W.; and Huebner, Charles F., 4,187,313, Cl. 424-278.000.
Huempfner, David F., to American Hospital Supply Corporation. Rail system for bed or stretcher. 4,186,456, Cl. 5-428.000.
Hueschen, Robert E.; and Jens, Richard A., to General Electric Company. Rotating anode X-ray tube with improved thermal capacity. 4,187,442, Cl. 313-60.000.
Huet, Jean P.; and Courtois, Alain. Jack with translation and rotation movements. 4,186,911, Cl. 254-93.00R.
Huettl, Heinz: *See*—
Fahrenschon, Franz; Huettl, Heinz; and Dotzauer, Ewald, 4,187,414, Cl. 179-175.30S.
Huff, Joe T.: *See*—
Leslie, Elmer N.; Higgins, Bobby; and Huff, Joe T., 4,186,632, Cl. 83-13.000.
Huffman, Stanley E., to S. E. Huffman Corporation. Programmably controlled method for grinding end cutting tools and the like. 4,186,529, Cl. 51-288.000.
Hug, William F.; Hamerdinger, Randolph W.; Dunn, Phillip D.; and McQuillan, Robert C., to Xerox Corporation. Metal vapor laser discharge tube. 4,187,474, Cl. 331-94.50D.
Hundt, Eckart, to Siemens Aktiengesellschaft. Method for the adjustment of a semiconductor disc relative to a radiation mask in X-ray photolithography. 4,187,431, Cl. 250-492.00A.
Hung, William M.: *See*—
Schmidt, Paul J.; and Hung, William M., 4,187,223, Cl. 260-343.30R.
Hunt, C. D., Jr., to Tinker, Inc. Basketball game. 4,186,928, Cl. 273-244.000.
Hunt Electronics, Inc.: *See*—
Morriss, James W., 4,187,528, Cl. 361-399.000.
Hunter, Joseph J.: *See*—
Bryce, Graham W.; and Hunter, Joseph J., 4,187,411, Cl. 219-137.200.
Hunter, Lee. Safety gate for vehicle wheel alignment pit installations. 4,186,521, Cl. 49-30.000.
Hunter, Walter D.: *See*—
Park, Jack H.; and Hunter, Walter D., 4,187,185, Cl. 252-8.55D.
Husain, Ahmed, to Amerace Corporation. Floating anchor nut assembly and basket member component. 4,186,787, Cl. 151-41.730.
Hutchinson, Loyd B.; and Blanchard, Robert R., to Dow Chemical Company, The. Extrusion process for reducing melt fracture. 4,187,269, Cl. 264-171.000.
Hutchison, Marion E. Clutch-brake mechanism. 4,186,545, Cl. 56-113.000.
Hy-Gain de Puerto Rico, Inc.: *See*—
Yiu, Joseph T.; Lea, Jeffrey G.; and Holmes, Roy L., 4,187,464, Cl. 325-470.000.
Hydril Company: *See*—
Burton, James A., 4,186,776, Cl. 138-30.000.
Ideal Toy Corporation: *See*—
Ensmann, Burt, 4,186,516, Cl. 46-107.000.
Idemoto, Atsushi: *See*—
Mizuno, Haruyuki; Idemoto, Atsushi; and Horie, Kunihiro, 4,187,067, Cl. 425-313.000.
IFO Sanitar AB: *See*—
Rosenberg, Ralf H. S.; and Ferm, Morgan H. O., 4,186,450, Cl. 4-6.000.
Igarashi, Taizo: *See*—
Shimizu, Hirozumi; Igarashi, Taizo; Ishizaki, Takaharu; Koma, Toshio; and Takahashi, Hideki, 4,187,078, Cl. 44-51.000.
Iijima, Masakatu, to Nippon Gakki Seizo Kabushiki Kaisha. Keyboard device for an electronic musical instrument. 4,186,638, Cl. 84-1.010.
Iinuma, Kazuhiro, to Tokyo Shibaura Electric Co., Ltd. Ultrasonic diagnosing apparatus. 4,186,747, Cl. 128-660.000.
Iizuka, Haruhiko; and Marumo, Nagayuki, to Nissan Motor Company Limited. Split engine operation of closed loop controlled multi-cylinder internal combustion engine. 4,186,715, Cl. 123-198.00F.
Ikeda, Junichi: *See*—
Ito, Yoshimasa; and Ikeda, Junichi, 4,187,454, Cl. 318-568.000.
Ikura, Katsuyata; Katsuura, Kiyoshi; and Kataoka, Masaaki, to Nippon Soda Company, Ltd. 1-[N-(4-chloro-2-trifluoromethylphenyl)-phenylacetimidoyl]imidazole, metal complexes thereof, and fungicidal compositions. 4,187,302, Cl. 424-245.000.
Immler, Rolf; and Bouvard, Hans, to Ciba-Geigy Corporation. Procedure for treating mammals to control parasitic diptera larvae. 4,187,304, Cl. 424-249.000.
Immler, Rolf; and Bouvard, Hans, to Ciba-Geigy Corporation. Procedure for treating mammals to control parasitic diptera larvae. 4,187,305, Cl. 424-249.000.
Imperial Chemical Industries Limited: *See*—
Brittain, David R.; Brown, Edward D.; Hepworth, Walter; and Stacey, Gilbert J., 4,187,310, Cl. 424-258.000.
Clifford, Michael L., 4,187,278, Cl. 422-132.000.
Hepworth, Paul; and Ripley, Ian S., 4,187,362, Cl. 526-73.000.
Mathews, Carl F.; Deverell, Christopher; Pears, Gordon E. A.; and Knowles, Peter G., 4,187,113, Cl. 430-533.000.
Inami, Yasuhiko: *See*—
Yano, Kohzo; Hishida, Tadanori; Inami, Yasuhiko; and Wada, Tomio, 4,187,004, Cl. 350-357.000.
Industrie Pirelli S.p.A.: *See*—
Angioletti, Attilio; and Citelli, Giosue, 4,186,736, Cl. 128-201.190.
Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft: *See*—
Miller, Harry B., 4,186,890, Cl. 242-18.00A.
Inland Container Corporation: *See*—
Krack, George W., 4,186,834, Cl. 206-320.000.
Innocenti Santeustacchio S.p.A.: *See*—
Passoni, Teresio; Calmes, Jean P.; Cattaneo, Filippo; and Nessi, Aurindo, 4,186,585, Cl. 72-208.000.
Inoue, Eiichi; and Yamaguchi, Takashi, to Fuji Photo Film Co., Ltd. Radioelectrophotography process. 4,187,424, Cl. 250-315.100.
Institut Francais du Petrol: *See*—
Euzen, Jean-Paul; Vuillemot, Daniel; and Dujardin, Claude, 4,187,169, Cl. 208-157.000.
Institut Francais du Petrole: *See*—
Delignieres, Robert, 4,187,492, Cl. 367-127.000.
Institut Kibernetiki Akademii Nauk Ukrainskoi SSR: *See*—
Skurikhin, Vladimir I.; Fainzilberg, Leonid S.; and Zhitetsky, Leonid S., 4,187,541, Cl. 364-497.000.
InstytutBadan Jadrowych: *See*—
Pochwalski, Krzysztof K.; and Radoszewski, Tomasz E., 4,187,428, Cl. 250-366.000.
Insul Company, Inc.: *See*—
La Bate, Micheal D.; and Perri, Joseph A., 4,186,908, Cl. 249-197.000.
International Business Machines Corporation: *See*—
Ahn, Kie Y.; Cohen, Mitchell S.; Powers, John V.; and Tao, Lungjo, 4,187,553, Cl. 365-8.000.
Anderson, Robert W.; Brock, Steven F.; and Gee, May L., 4,186,871, Cl. 235-380.000.
Barclay, Donald J., 4,187,003, Cl. 350-357.000.
Berkenblit, Melvin; and Reisman, Arnold, 4,187,140, Cl. 156-662.000.
Crooks, Walter, 4,187,329, Cl. 430-110.000.
Ficker, Walter W.; Lonser, David E.; Rance, William G.; Stricker, Alfred A.; and von Kaenel, Walter, 4,186,918, Cl. 271-232.000.
Gilovich, Paul A.; and Lynott, John J., 4,186,977, Cl. 312-215.000.
Hsioh-Lien Ma, William, 4,187,331, Cl. 430-328.000.
Knappe, LaVerne F.; Peterson, Roger H.; and Stroebel, Gary J., 4,187,452, Cl. 318-128.000.
International Computers Limited: *See*—
Eaton, John R., 4,187,539, Cl. 364-200.000.
International Drum Corporation: *See*—
McConnel, Tim, 4,186,865, Cl. 229-5.700.
International Harvester Company: *See*—
Ward, Gerald G., 4,186,806, Cl. 172-283.000.
International Solar Technologies, Inc.: *See*—
Muessig, Charles E., 4,186,722, Cl. 126-270.000.
International Telephone and Telegraph Corporation: *See*—
Du Bae, Hyung, 4,186,603, Cl. 73-231.00R.

Interondo AG: *See—*
Hofer, Otto, 4,186,835, Cl. 206-443.000.
Intrater, Joseph; and Gorman, Ralph. Apparatus for vapor deposition of materials. 4,186,684, Cl. 118-725.000.
Inventor's Inc.: *See—*
Albert, Kenneth J., 4,186,842, Cl. 220-206.000.
Investigacion y Desarrollo de Nuevas Technicas para Automatismo, S.A. (I.D.T.A., S.A.): *See—*
Garcia Ramos, Jose J., 4,187,550, Cl. 364-900.000.
Irick, Gether, Jr.; Ownby, James C.; and Wang, Richard H. S., to Eastman Kodak Company. Multiheterocyclic ultraviolet stabilizers and their use in organic compositions. 4,187,213, Cl. 252-402.000.
Irick, Gether, Jr.; Kelly, Charles A.; and Martin, James C., to Eastman Kodak Company. Bis-benzotriazole compounds. 4,187,229, Cl. 548-260.000.
Ishigaki, Hisao; Tanaka, Ryuzo; and Nakamima, Koichi, to Citizen Watch Co., Ltd. Wristwatch case. 4,186,552, Cl. 58-88.00W.
Ishii, Tadayoshi; Okura, Zenichi; and Machida, Takeshi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Tripod rack and pinion focussing mechanism rotatable relative to lens. 4,187,020, Cl. 354-195.000.
Ishikawa, Tadashi; and Kamimae, Hiroshi, to Nihon Nousan Kougyou Co., Ltd. Method for producing eggs containing a high amount of iodinated amino acids. 4,187,294, Cl. 424-150.000.
Ishikawa, Yasuaki: *See—*
Shibuya, Teiji; Ishikawa, Yasuaki; Saito, Masayuki; and Ueda, Kiyoharu, 4,187,085, Cl. 55-4.000.
Ishikura, Tadashi: *See—*
Kyo, Kayomon; Asai, Yasuhiko; Kato, Sadao; Ishikura, Tadashi; and Sugawara, Hiroshi, 4,187,358, Cl. 525-132.000.
Ishimaru, Yasuo; Kobayashi, Hiroshi; and Tamura, Junji, to Hitachi, Ltd. Method for producing a welded joint. 4,186,864, Cl. 228-226.000.
Ishizaka, Sunao, to Nippon Kogaku K.K. Viewfinder focusing screen supporting apparatus for single-lens reflex camera. 4,187,016, Cl. 354-152.000.
Ishizaki, Takaharu: *See—*
Shimizu, Hirozumi; Igarashi, Taizo; Ishizaki, Takaharu; Koma, Toshio; and Takahashi, Hideki, 4,187,078, Cl. 44-51.000.
Ishizuka, Kohei; Takasaki, Yoshitaka; Kita, Yasuhiro; Nagoya, Yoshinori; and Kusama, Takeo, to Hitachi, Ltd. Variable equalizer. 4,187,479, Cl. 333-28.00R.
Istituto Biologico Chemioterapico "ABC" S.p.A.: *See—*
Franzone, Jose S.; and Tamietto, Teresio, 4,187,308, Cl. 424-253.000.
Isuzu Motors Limited: *See—*
Kawamura, Hideo; Kubota, Kimi; and Ohta, Hideo, 4,186,692, Cl. 123-32.00L.
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Wehrmann, Nicholas; and Williams, Charlie L., 4,186,471, Cl. 28-154.000.
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Okada, Akihiro, 4,186,976, Cl. 312-194.000.
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Kanemaru, Kenji; and Iwasaki, Takashiroh, 4,187,018, Cl. 354-266.000.
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Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,187,547, Cl. 364-710.000.
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Mizuno, Haruyuki; Idemoto, Atsushi; and Horie, Kunihiro, 4,187,067, Cl. 425-313.000.
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Takemoto, Nagaaki; Sakurai, Teruo; Mashiko, Kimio; and Tomari, Harumatsu, 4,186,756, Cl. 131-140.00C.
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Hohnjec, Marijan; and Japelj, Miha, 4,187,244, Cl. 260-465.00E.
Jarm, Robert L., to Credit Industry Associates, Inc. Lock opening device. 4,186,577, Cl. 70-394.000.
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Hueschen, Robert E.; and Jens, Richard A., 4,187,442, Cl. 313-60.000.
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Jensen, Ronald N. Targeting thermostat. 4,186,874, Cl. 236-46.00R.
Jernow, Jane L.: *See—*
Holland, George W.; Jernow, Jane L.; and Rosen, Perry, 4,187,381, Cl. 560-121.000.
Jessee, John W. Vehicle guidance device. 4,187,494, Cl. 340-52.00R.
Joerg, Manfred, to Mueller, Helga. Ignition device with speed limitation for internal combustion engines. 4,186,711, Cl. 123-148.0CC.
Joh, Yasushi, to Nippon Zeon Co. Ltd. Hollow-fiber permeability apparatus. 4,187,180, Cl. 210-321.00R.
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Preston, Gary W.; Johannesen, Donald D.; and Kestermeier, William J., 4,186,824, Cl. 188-73.500.
Johannisson, Tom; Nilsson, Kai; Sjoblom, Rolf; and Widell, Marja, to ASEA Aktiebolag. Press for hydrostatic extrusion of tubes and profiles. 4,186,582, Cl. 72-60.000.
John MacDonald & Company (Pneumatic Tools) Limited: *See—*
Allan, David T., 4,186,810, Cl. 175-96.000.
Johnson & Johnson: *See—*
Ness, Irving S., 4,186,744, Cl. 128-287.000.
Johnson, Joseph R., to Electro Mag Sales. Endless tape winding device. 4,186,891, Cl. 242-55.19R.
Johnson, Reginald F., to Baker Perkins Holding Limited. Wrapping machines. 4,186,544, Cl. 53-537.000.
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Jones, Charles H., to United States of America, Navy. Electro-acoustic transducer with line focus. 4,187,556, Cl. 367-155.000.
Jones, Fred E. Gathering blade apparatus for assisting in loading the bucket on a front-end loader. 4,187,049, Cl. 414-704.000.
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Jones, Gerald P.: *See—*
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Jones, Giffin D.; and Asperger, Robert G., to Dow Chemical Company, The. Polyalkylenimine-alkylene sulfide graft copolymer and method of making same. 4,187,256, Cl. 525-471.000.
Jonsson, Arne, to NYBY Bruk AB. Method and means for rapid replacement of damaged pipe sections. 4,186,475, Cl. 138-97.000.
Jordan, Pierre. Liquid scintillation spectrometry process and apparatus. 4,187,426, Cl. 250-364.000.
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Josse, Rene; and Klaui, Heinrich, to Hoffmann-La Roche Inc. Powder compositions containing vitamin C active component. 4,187,322, Cl. 426-72.000.
Jouret, Edouard, to Crouzet. Programmer for electric household appliances. 4,186,550, Cl. 58-21.130.
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Jurgens, Rainer, to Christensen, Inc. Rotary helical fluid motor with deformable sleeve for deep drilling tool. 4,187,061, Cl. 418-48.000.
Kabanov, Viktor A.; Martynova, Marina A.; Pluzhnov, Stanislav K.; and Smetanjuk, Vladimir I. Catalyst for the dimerization of olefins. 4,187,197, Cl. 252-431.00P.
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Kabushiki Kaisha Meidensha: *See—*
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Kahn, Morris S. Underwater observatory. 4,186,532, Cl. 52-169.100.
Kamakura, Ichiro. Binocular with an arrangement for adjusting the distance between two telescopes. 4,186,992, Cl. 350-36.000.

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Homma, Kokichi, deceased; and Kameyama, Yoshio, 4,187,107, Cl. 430-252.000.
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Kammann, Clarence H., to Control Data Corporation. Fault tolerant bubble memory with redundancy using a stationary register on a single chip. 4,187,554, Cl. 365-15.000.
Kamyr, Inc.: *See*—
Kindersley, Peter G., 4,187,043, Cl. 406-105.000.
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Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; Tabata, Yasuhiro; and Kaneko, Tamaki, 4,187,024, Cl. 355-14.00R.
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Kao, Lin, to GTE Sylvania Far East Limited. Electronic clock radio having nap/sleep feature. 4,187,468, Cl. 325-396.000.
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Karlen, Urs, to Ciba-Geigy Corporation. Anthraquinone disperse dyes. 4,187,238, Cl. 260-376.000.
Karoly, Gabriel, to M&T Chemicals Inc. Novel trifunctional aromatic amines. 4,187,250, Cl. 260-578.000.
Kasson, James M.; and Graham, Martin H., to Rolm Corporation. Signal injection technique. 4,187,466, Cl. 325-42.000.
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Katsof, Barry; and Matlin, Joel, to Camtron Electronics International Ltd. Camera system. 4,187,015, Cl. 354-109.000.
Katsumoto, Kiyoshi; and Marquis, David M., to Chevron Research Company. Method for preparing maleic anhydride. 4,187,235, Cl. 260-346.750.
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Anshus, Byron E.; Katsumoto, Kiyoshi; and Serkes, Ira M., 4,187,370, Cl. 528-312.000.
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Katz, Amnon. Tunable link. 4,186,568, Cl. 64-1.00V.
Kaufman, Arnold S.; and Anderson, Robert L., to National Food Service Equipment Fabricators, Inc. Air ventilation and washing system. 4,186,727, Cl. 126-299.00D.
Kaufmann, Rudolf: *See*—
Deinhammer, Wolfgang; Kaufmann, Rudolf; Braunling, Hermann; and Haberle, Norman, 4,187,237, Cl. 260-347.300.
Kautz, Glenn E., to H. H. Robertson Company. Method for producing shaped glass fiber reinforced gypsum articles. 4,187,130, Cl. 156-42.000.
Kautz, Glenn E.: *See*—
Bracalielly, Albert J.; Kautz, Glenn E.; Lindner, Robert G.; and Davis, Bernard H., 4,187,275, Cl. 264-511.000.
Kauzlarich, James J.: *See*—
Lewis, David W.; and Kauzlarich, James J., 4,186,745, Cl. 128-349.00R.
Kavitsky, Mikhail R.: *See*—
Gorlitsyn, Sergei N.; Kavitsky, Mikhail R.; Koires, Vladimir I.; Efimov, Leonid A., deceased; and Gebler, Iraida I., administratrix, 4,186,588, Cl. 72-394.000.
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Narisawa, Shigeyuki; Yoshida, Shohei; and Kawahara, Hiroshi, 4,187,377, Cl. 544-219.000.
Kawamura, Hideo; Kubota, Kimi; and Ohta, Hideo, to Isuzu Motors Limited. Compression ignition internal combustion engine with auxiliary swirl combustion chamber. 4,186,692, Cl. 123-32.00L.
Kaye, Gordon E., to P. R. Mallory & Co. Inc. Battery connector. 4,186,983, Cl. 339-91.00R.
Kazda, Stanislav: *See*—
Mayer, Karl H.; Heitzer, Helmut; Hoffmeister, Friedrich; Heise, Arend; and Kazda, Stanislav, 4,187,306, Cl. 424-251.000.
KBS Enterprises: *See*—
King, John M., 4,186,717, Cl. 126-66.000.
Kearns, Thomas N.: *See*—
Bruner, A. J.; Foster, Edward T.; and Kearns, Thomas N., 4,186,913, Cl. 256-13.100.
Keefer, Bowie G. Reverse osmosis method and apparatus. 4,187,173, Cl. 210-23.00H.
Keiper Automobiltechnik GmbH & Co. KG: *See*—
Reinmoller, Adolf; Voss, Hans W.; and Kluting, Bernd, 4,186,904, Cl. 248-395.000.
Keller, Douglas V., Jr.; and Rainis, Andrew, to Otisca Industries, Ltd. Processes for recovering coal. 4,186,887, Cl. 241-20.000.
Kelley, Hugh D. Conveyor for handling free-flowing material. 4,186,832, Cl. 198-861.000.
Kelly, Charles A.: *See*—
Irick, Gether, Jr.; Kelly, Charles A.; and Martin, James C., 4,187,229, Cl. 548-260.000.
Kendall Company, The: *See*—
Marshall, Preston F., 4,186,463, Cl. 19-304.000.
Patel, Bhupendra C., 4,186,750, Cl. 128-748.000.
Kennedy, Sterling R. Method for reactivating carbon. 4,187,195, Cl. 252-412.000.
Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Morschl, Paul; and Zimmer, Erich, 4,187,280, Cl. 423-15.000.
Kerstein, Irving J.: *See*—
Schenker, M. Allan; and Kerstein, Irving J., 4,186,790, Cl. 160-329.000.
Kestermeier, William J.: *See*—
Preston, Gary W.; Johannesen, Donald D.; and Kestermeier, William J., 4,186,824, Cl. 188-73.500.
Ketchum, John L. Football offensive player training apparatus. 4,186,922, Cl. 273-55.00R.
Ketori, Takao: *See*—
Noguchi, Takaharu; Ketori, Takao; Tamura, Kohji; Oi, Tetsu; and Miyoshi, Yutaka, 4,186,481, Cl. 29-603.000.
Key, John W. Screen-printing frame with plastic side bars bondable to fabric by surface-softening. 4,186,660, Cl. 101-128.100.
Key, Paul F.; and Lazzara, Anthony R., to Scientific Technology Inc. Optical relay. 4,187,421, Cl. 250-199.000.
Keystone Consolidated Industries, Inc.: *See*—
Glass, Dwight W., 4,186,952, Cl. 292-202.000.
Keznickl, Eduard, to Vockenhuber, Karl; and Hauser, Raimund. Photographing or playback-device. 4,187,008, Cl. 352-108.000.
Khalemsky, Samuil F.: *See*—
Sladkoshteev, Vladimir T.; Shatagin, Oleg A.; Khalemsky, Samuil F.; and Besedina, Eleonora B., 4,186,791, Cl. 164-66.000.
Khan, Amir U.; Khan, Habib U.; and Amid, Ahamed A. Telescoping carpenter's scale. 4,186,493, Cl. 33-161.000.
Khan, Habib U.: *See*—
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Tseluiko, Jury I.; Kutsykovich, Dorina B.; Shabelnikova, Ljudmila A.; Kholopov, Vladimir P.; Schekin, Nikolai G.; Gritsuk, Lev D.; and Katsenelenbogen, Leonid B., 4,186,798, Cl. 165-147.000.
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Khuntia, Natabara; and Rader, Charles W., to General Motors Corporation. Disc brake pack wear indicator. 4,186,822, Cl. 188-1.00A.
Kiene, Wilfried: *See*—
Appel, Eggert; Gehrke, Herbert; and Kiene, Wilfried, 4,186,600, Cl. 73-194.0EM.
Kienzle Apparate GmbH: *See*—
Dold, Berthold, 4,187,510, Cl. 346-21.000.
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Hamane, Tokuhito; Kinoshita Toshio; and Kihira, Masafumi, 4,186,478, Cl. 29-596.000.
Kilgore, James W. Hairdresser's hand protector. 4,186,442, Cl. 2-20.000.
Kilgore, Woodson B. Vehicle digital anti-theft system. 4,186,710, Cl. 123-146.50B.
Kim, Charles W.; Liu, Chia-Seng; and MacDuff, Richard, to Hercules Incorporated. Network structures and methods of making same. 4,186,781, Cl. 139-420.00R.
Kimball International, Inc.: *See*—
Robinson, John W.; and Dietrich, Ralph N., 4,186,639, Cl. 84-1.030.
Kimerer, Neil B., Jr. Flat-bodied nymph hook. 4,186,510, Cl. 43-42.250.
Kinder, Leon. Drift free spraying apparatus. 4,186,879, Cl. 239-172.000.
Kindersley, Peter G., to Kamyr, Inc. Method and apparatus for boosting pressure in a coal pipeline. 4,187,043, Cl. 406-105.000.
King, John M., to KBS Enterprises. Stove structure. 4,186,717, Cl. 126-66.000.
King, Walter D.: *See*—
Stanonis, David J.; King, Walter D.; and Coll, Emory E., 4,186,608, Cl. 73-437.000.
Kinnamon, Kenneth E., to United States of America, Army. Use of phosphonium salts in treatment of African trypanosomiasis. 4,187,300, Cl. 424-198.000.
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Hamane, Tokuhito; Kinoshita Toshio; and Kihira, Masafumi, 4,186,478, Cl. 29-596.000.
Kira, Hideshi: *See*—
Endoh, Kenjiro; Ohkawa, Motokazu; Kitagawa, Kazuo; and Kira, Hideshi, 4,187,477, Cl. 333-14.000.
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Kirkpatrick, George F., to Union Carbide Corporation. Colored interlocking closure strips for a container. 4,186,786, Cl. 150-3.000.

Kirsch, Jerry; and Kirsch, Kerry F. Rotary video article centering, orienting and transfer device for computerized electronic operating systems. 4,187,051, Cl. 414-744.000.
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Kirsch, Jerry; and Kirsch, Kerry F., 4,187,051, Cl. 414-744.000.
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Endoh, Kenjiro; Ohkawa, Motokazu; Kitagawa, Kazuo; and Kira, Hideshi, 4,187,477, Cl. 333-14.000.
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Kivenson, Gilbert. Counterfeit detector for paper currency. 4,187,463, Cl. 324-228.000.
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Josse, Rene; and Klaui, Heinrich, 4,187,322, Cl. 426-72.000.
Klaus, Arthur, to Signode Corporation. Debris collecting mechanism for pneumatic driving tools. 4,186,862, Cl. 227-130.000.
Klein, Elias: *See*—
Rembaum, Alan; Yen, Shiao-Ping S.; and Klein, Elias, 4,187,333, Cl. 427-230.000.
Klipinitser, Iosif L.: *See*—
Pavlikov, Rudolf Z.; Shorygina, Natalya V.; Strupinsky, Vladimir A.; Kruglikov, Anatoly A.; Farbshtein, Jury G.; and Klipinitser, Iosif L., 4,187,369, Cl. 528-137.000.
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Brachthauser, Kunibert; Ramesohl, Hubert; Beisner, Klaus; and Herchenbach, Horst, 4,187,071, Cl. 432-106.000.
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Klug, Frederic J.: *See*—
Greskovich, Charles D.; Klug, Frederic J.; and Pasco, Wayne D., 4,187,266, Cl. 264-43.000.
Kluting, Bernd: *See*—
Reinmoller, Adolf; Voss, Hans W.; and Kluting, Bernd, 4,186,904, Cl. 248-395.000.
Knappe, LaVerne F.; Peterson, Roger H.; and Stroebel, Gary J., to International Business Machines Corporation. Electromechanical torsional oscillator with resonant frequency and amplitude control. 4,187,452, Cl. 318-128.000.
Knoble, David W., to General Electric Company. Discharge lamp operating circuit. 4,187,449, Cl. 315-205.000.
Knogo Corporation: *See*—
Weiner, Arnold, 4,187,509, Cl. 343-873.000.
Knowles, Peter G.: *See*—
Mathews, Carl F.; Deverell, Christopher; Pears, Gordon E. A.; and Knowles, Peter G., 4,187,113, Cl. 430-533.000.
Kobayashi, Hiroshi: *See*—
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Kobayashi, Masayoshi: *See*—
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Kobler, Robert J., to AMP Incorporated. Electrical connector receptacles. 4,186,988, Cl. 339-176.0MP.
Koch, Edwin R.; Abbazia, Leonard P.; and Puglia, Wayne J., to Warner-Lambert Company. Process for preparing chewing gum base using solid elastomer. 4,187,320, Cl. 426-3.000.
Koga, Noboru. Concrete mold fastening device and tool for said device. 4,186,906, Cl. 249-41.000.
Kohlen, Rudolf: *See*—
Hafke, Carl; Weber, Roland; and Kohlen, Rudolf, 4,187,080, Cl. 48-202.000.
Kohler, Werner: *See*—
Muller, Bruno; and Kohler, Werner, 4,187,437, Cl. 307-147.000.
Koide, Hiroshi; Watanabe, Junichi; and Tenmyo, Shigemoto, to Ricoh Co., Ltd. Angularly rotatable mirror apparatus. 4,186,991, Cl. 350-6.910.
Koires, Vladimir I.: *See*—
Gorlitsyn, Sergei N.; Kavitsky, Mikhail R.; Koires, Vladimir I.; Efimov, Leonid A., deceased; and Gebler, Iraida I., administratrix, 4,186,588, Cl. 72-394.000.
Koizumi, Yutaka: *See*—
Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; Tabata, Yasuhiro; and Kaneko, Tamaki, 4,187,024, Cl. 355-14.00R.
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Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M., 4,186,793, Cl. 164-158.000.
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Morley, Colin A.; Thomas, Richard N.; and Koliar, Bela, 4,187,505, Cl. 340-753.000.
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Zeblisky, Rudolph J., 4,187,198, Cl. 252-434.000.
Kolosov, Ivan A.; Ivanyatov, Jury E.; and Pevnev, Vladimir N. Apparatus for winding strips. 4,186,893, Cl. 242-56.900.
Koma, Toshio: *See*—
Shimizu, Hirozumi; Igarashi, Taizo; Ishizaki, Takaharu; Koma, Toshio; and Takahashi, Hideki, 4,187,078, Cl. 44-51.000.
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Stepniak, Frank M.; and Kominiak, Andrew A., 4,186,985, Cl. 339-111.000.
Kondo, Masatsune; and Tanoue, Akira, to Sumitomo Chemical Company. Process for preparing polymer resins of high impact resistance. 4,187,202, Cl. 260-4.00R.
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Nishibe, Kouji; and Kondo, Nobuaki. 4.186.643. Cl. 84-1.240.
Kondo, Shigeki, to Tokyo Juki Kogyo Kabushiki Kaisha. Apparatus for fulling fabric. 4,186,469, Cl. 26-19.000.
Konishiroku Photo Industry Co., Ltd.: *See*—
Tarumi, Noriyoshi; Ueno, Kenji; and Sakaguchi. Hirofumi, 4,186,606, Cl. 73-351.000.
Kono, Masahiro: *See*—
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Korber, Alfred: *See*—
Bauer, Kurt; and Korber, Alfred, 4,187,222, Cl. 260-343.000.
Kornilov, Anatoly A.; Petrushkin, Viktor D.; Stetsko, Viktor N.; and Fridman, Viktor M. Apparatus for classifying liquid mixture in accordance with molecular weight. 4,187,181, Cl. 210-332.000.
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Koseki, Shyushi, to Nissan Motor Company, Limited. Temperature control system of an engine exhaust gas component sensor. 4,186,694, Cl. 123-41.310.
Kosobutsky, Alexandr A.: *See*—
Yascheritsyn, Petr I.; Sakulevich, Faddei J.; Olender, Leonty A.; and Kosobutsky, Alexandr A., 4,186,528, Cl. 51-161.000.
Kosup, Russell R., to Unicorn Industries. Multiple capacity circuit breaker. 4,187,482, Cl. 335-12.000.
Kouda, Masanori, to Atsugi Motor Parts Co., Ltd. Servo valve for power steering booster. 4,186,652, Cl. 91-434.000.
Koutsky, L. John, to Sears Manufacturing Company. Upright vehicle seat support. 4,186,963, Cl. 297-308.000.
Kovar, Jan; Drkal, Jan; Zalesak, Jan; and Hladky, Vaclav, to Vyzkumny ustav tvarecich stroju a technologie tvareni. Apparatus for cross wedge rolling. 4,186,583, Cl. 72-108.000.
Kovar, Jan: *See*—
Zalesak, Jan; and Kovar, Jan, 4,186,580, Cl. 72-14.000.
Kovens, Michael L.; and Hoge, Henry H., to Universal Security Instruments, Inc. Keyless vehicle intrusion alarm. 4,187,496, Cl. 340-63.000.
Kozlov, Mikhail D.: *See*—
Gorodissky, Leonid G.; Vasilieva, Raisa V.; Zhmurov, Vyacheslav I.; Kozlov, Mikhail D.; Kuzmina, Vera I.; and Romanov, Nikolai T., deceased, 4,186,571, Cl. 68-5.00E.
Kozuka, Hirotsugu: *See*—
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Krack, George W., to Inland Container Corporation. Shipping and storage container. 4,186,834, Cl. 206-320.000.
Krafka, Jerry L.: *See*—
Black, Robert D.; Hennen, John J.; and Krafka, Jerry L., 4,186,889, Cl. 241-89.200.
Kraftwerk Union Aktiengesellschaft: *See*—
Stehle, Heinz, 4,187,157, Cl. 204-157.10R.
Kreis, Joseph W.: *See*—
Zehel, Joseph J.; and Kreis, Joseph W., 4,187,417, Cl. 200-254.000.
KRKA, Farmaceutika, Kemija, Kozmetika, zdravilisca in gostinstuo, Novo mesto, n.sd.o.: *See*—
Hohnjec, Marijan; and Japelj, Miha, 4,187,244, Cl. 260-465.00E.
Krone, Hartmut: *See*—
Huber, Paul; Schiessl, Alois; and Krone, Hartmut, 4,186,664, Cl. 102-66.000.
Kruglikov, Anatoly A.: *See*—
Pavlikov, Rudolf Z.; Shorygina, Natalya V.; Strupinsky, Vladimir A.; Kruglikov, Anatoly A.; Farbshtein, Jury G.; and Klipinitser, Iosif L., 4,187,369, Cl. 528-137.000.
Kruper, Wayne A., to Gould Inc. Method of removing copper ions from a bath containing same. 4,187,166, Cl. 204-43.00S.
Kruse, Robert L.; and DeJackome, Gene E., to Monsanto Company. Mass polymerization process for polyblends. 4,187,260, Cl. 525-263.000.
Kubik, Charles K.: *See*—
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Kubota, Kimi: *See*—
Kawamura, Hideo; Kubota, Kimi; and Ohta, Hideo, 4,186,692, Cl. 123-32.00L.

Kuester, Donald W., to United States of America, Navy. Pressure sensitive hydraulic valve. 4,186,768, Cl. 137-516.250.

Kuhmonen, Charles D. Ice removing machine. 4,186,967, Cl. 299-25.000.

Kuhn, James O.; Wright, James J.; and Bollinger, Howard N., to CPG Products Corp. Doll with arm-actuated fingers. 4,186,517, Cl. 46-119.000.

Kukla, George W.: *See*—
Beke, Zoltan; and Kukla, George W., 4,186,496, Cl. 34-114.000.

Kulesza, Ralph J.; and Breslow, Jeffrey D., to Marvin Glass & Associates. Game with upstanding transparent enclosure and movable firing means. 4,186,926, Cl. 273-340.000.

KUNDO - Kieninger & Obergfell: *See*—
Scheer, Erich, 4,187,499, Cl. 340-309.100.

Kunin, Robert; and Blaine, Louis I., to Ecodyne Corporation. Method for purification of polyhydric alcohols. 4,187,120, Cl. 127-46.00A.

Kuo, Sheafen F. Thermal conversion engine. 4,186,558, Cl. 60-527.000.

Kupferdraht-Isolierwerk Ag Wildegg: *See*—
Voser, Othmar, 4,187,391, Cl. 174-106.00R.

Kurahashi, Kazuo: *See*—
Takamura, Masayuki; Shinoda, Norio; Kurahashi, Kazuo; and Hatae, Masataka, 4,186,586, Cl. 72-264.000.

Kuramochi, Koujiro, to Toyota Jidosha Kogyo Kabushiki Kaisha. Oil pressure control means for an automatic transmission. 4,186,627, Cl. 74-869.000.

Kurek, Joseph: *See*—
Muller, Jean-Claude; Ponpon, Jean-Pierre; Kurek, Joseph; and Siffert, Paul, 4,187,124, Cl. 148-1.500.

Kurita, Masaru: *See*—
Tanaka, Kunihiko; Kurita, Masaru; and Nishiwaki, Osamu, 4,187,374, Cl. 544-28.000.

Kuroi, Hisashi; Miyajima, Masayoshi; and Matoba, Takao, to Kuroi Kosan Co., Ltd. Discharge lamp lighting device. 4,187,448, Cl. 315-176.000.

Kuroi Kosan Co., Ltd.: *See*—
Kuroi, Hisashi; Miyajima, Masayoshi; and Matoba, Takao, 4,187,448, Cl. 315-176.000.

Kurosaki, Makoto, to Nippon Gakki Seizo Kabushiki Kaisha. Foot pedal assembly for drums. 4,186,644, Cl. 84-422.00R.

Kurtz, Bruce E., to Allied Chemical Corporation. Process and apparatus for isothermal chlorination of hydrocarbons. 4,187,253, Cl. 260-662.00R.

Kusama, Takeo: *See*—
Ishizuka, Kohei; Takasaki, Yoshitaka; Kita, Yasuhiro; Nagoya, Yoshinori; and Kusama, Takeo, 4,187,479, Cl. 333-28.00R.

Kutsykovich, Dorina B.: *See*—
Tseluiko, Jury I.; Kutsykovich, Dorina B.; Shabelnikova, Ljudmila A.; Kholopov, Vladimir P.; Schekin, Nikolai G.; Gritsuk, Lev D.; and Katsenelenbogen, Leonid B., 4,186,798, Cl. 165-147.000.

Kuzmina, Vera I.: *See*—
Gorodissky, Leonid G.; Vasilieva, Raisa V.; Zhmurov, Vyacheslav I.; Kozlov, Mikhail D.; Kuzmina, Vera I.; and Romanov, Nikolai T., deceased, 4,186,571, Cl. 68-5.00E.

Kuznetsov, German N.: *See*—
Grigorenko, Anatoly S.; Moroz, Jury A.; Kortusov, Leonid I.; Kuznetsov, German N.; and Franchenko, Nina A., 4,186,587, Cl. 72-354.000.

Kvita, Vratislav: *See*—
Darms, Roland; Pfeifer, Josef; and Kvita, Vratislav, 4,187,364, Cl. 526-259.000.

Kyo, Kayomon; Asai, Yasuhiko; Kato, Sadao; Ishikura, Tadashi; and Sugawara, Hiroshi, to Unitika Ltd. Resin composition. 4,187,358, Cl. 525-132.000.

Kytta, Oswald O., to Bendix Corporation, The. Internal force multiplier for a servomotor. 4,186,650, Cl. 91-369.00A.

L. B. (Plastics) Limited: *See*—
Litchfield, Leon G., 4,186,979, Cl. 312-333.000.

LaBate, Michael D. Process and material for treating steel walls and fans in electrical precipitation installations with micron colloidal graphite particles. 4,187,334, Cl. 427-236.000.

La Bate, Michael D. Process for treating coke oven doors and jambs to prevent the build up of tar thereon. 4,187,335, Cl. 427-318.000.

La Bate, Micheal D.; and Perri, Joseph A., to Insul Company, Inc. Expandable hot top for ingot moulds. 4,186,908, Cl. 249-197.000.

Labbe, Francis A. M., to Molins Limited. Cigarette manufacture. 4,186,754, Cl. 131-23.00A.

Labora Mannheim GmbH fur Labortechnik: *See*—
Haker, Rolf; Schrader, Klaus; and Thiery, Joachim, 4,187,462, Cl. 324-204.000.

Labortechnik M. R. Walter: *See*—
Walter, Karl, 4,187,022, Cl. 354-318.000.

Lagow, Richard J.; Shimp, Lawrence A.; and Clark, Leland C., Jr., to Suntech, Inc.; and Children's Hospital Medical Center. Tetramethylpentane blood substitutes. 4,187,252, Cl. 260-653.000.

Lake, Antony W.: *See*—
Cassidy, Frederick; and Lake, Antony W., 4,187,312, Cl. 424-274.000.

Lammer, Jurgen: *See*—
Abthoff, Jorg; Fricker, Ludwig; and Lammer, Jurgen, 4,186,705, Cl. 123-122.0AC.

Landis, Delmer H., Jr.; Lozier, Paul W.; Lievestro, Louis; Auxier, Thomas A.; and Starkweather, John H., to General Electric Company. Turbine band cooling system. 4,187,054, Cl. 415-115.000.

Landwehr, DeWayne A.: *See*—
Zeller, Gary P.; and Landwehr, DeWayne A., 4,186,915, Cl. 267-140.000.

Lanfermann, Willy: *See*—
Minke, Otto; and Lanfermann, Willy, 4,186,970, Cl. 299-43.000.

Lang, Stanley A., Jr.: *See*—
Child, Ralph G.; Lang, Stanley A., Jr.; Lee, Ving J.; and Lin, Yang-i, 4,187,373, Cl. 542-402.000.

Lange, Frederick F., to Westinghouse Electric Corp. Silicon nitride-silicon carbide composite material. 4,187,116, Cl. 106-44.000.

Lange, Gerhard: *See*—
Heinze, Klaus D.; and Lange, Gerhard, 4,187,526, Cl. 361-120.000.

Langer, Heimo J.; and McKillip, William J., to Ashland Oil, Inc. Bonding of rubber to reinforcing elements. 4,187,349, Cl. 428-395.000.

Langlais, Jacques F.: *See*—
Dauge, Gilbert V.; and Langlais, Jacques F., 4,187,460, Cl. 324-60.0CD.

Lankhorst Touwfabrieken B.V.: *See*—
Klobbie, Eduard J. G., 4,187,352, Cl. 521-79.000.

Lankro Chemicals Ltd.: *See*—
Sheridan, Geoffrey P., 4,187,192, Cl. 252-313.00R.

Lapp, John; and Willy, John R., to McGraw-Edison Company. Method of processing an electrical apparatus. 4,187,327, Cl. 427-8.000.

Larner, Michael W., to Rubinson & Friends, Inc. Automated mixing system with display/data entry subsystem. 4,187,544, Cl. 364-514.000.

Larson, Ivar W.: *See*—
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,187,547, Cl. 364-710.000.

Lask, Helmut: *See*—
Holst, Arno; Lask, Helmut; Nischwitz, Ehrenfried; and Fischer, Wilhelm, 4,187,342, Cl. 428-283.000.

Latham, Raymond E.: *See*—
Billingsley, Lloyd E.; and Latham, Raymond E., 4,186,950, Cl. 285-270.000.

Laube, David E.; and Simpson, Loran R., to Bourns, Inc. Potentiometer contact and rotor assembly. 4,186,483, Cl. 29-630.00B.

Lauffer, John R., to Martin-Copeland Company. Eyeglass construction. 4,187,007, Cl. 351-108.000.

Lawrence, Charles T., to Textron, Inc. Welded thermoplastic stringer for slide fastener and method of manufacture. 4,186,467, Cl. 24-205.16R.

Lazarchik, Robert E.: *See*—
Crane, Patrick E.; Lazarchik, Robert E.; and Schaufelberger, Arthur H., deceased, 4,187,507, Cl. 343-754.000.

Lazzara, Anthony R.: *See*—
Key, Paul F.; and Lazzara, Anthony R., 4,187,421, Cl. 250-199.000.

Lea, Jeffrey G.: *See*—
Yiu, Joseph T.; Lea, Jeffrey G.; and Holmes, Roy L., 4,187,464, Cl. 325-470.000.

Le Coze, Rene-Jean M. Partition wall capable of being dismantled. 4,186,534, Cl. 52-241.000.

Lee, Peter D., to Governor and Company of the Bank of England, The. Security devices. 4,186,943, Cl. 283-7.000.

Lee, Ving J.: *See*—
Child, Ralph G.; Lang, Stanley A., Jr.; Lee, Ving J.; and Lin, Yang-i, 4,187,373, Cl. 542-402.000.

Legat, Wilhelm H.; Taft, Keith G.; and Tiefert, Karl H., to Raytheon Company. Semiconductor integrated circuits. 4,187,516, Cl. 357-60.000.

Legoria, Bernadette C. Assembly for facilitating teaching reading. 4,186,497, Cl. 35-35.00R.

Leining, Lyndon R., to Geo. A. Hormel & Company. Hand supported skinning device. 4,186,461, Cl. 17-21.000.

Lembens, Helmut: *See*—
Puschner, Herbert A.; and Lembens, Helmut, 4,187,405, Cl. 219-10.55A.

Len, George: *See*—
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Lentz, William P.: *See*—
Coppola, Frank T.; Lentz, William P.; and VanDewoestine, Robert V., 4,186,723, Cl. 126-443.000.

LeRoy, Edward W. Book mark-page line-reader. 4,186,683, Cl. 116-235.000.

Leslie, Elmer N.; Higgins, Bobby; and Huff, Joe T., to Camsco, Inc. Cutting system for slab-type materials. 4,186,632, Cl. 83-13.000.

Lestradet, Maurice C. J. System for positioning the spray boom of agricultural sprayers. 4,186,878, Cl. 239-160.000.

Levaillant, Claude, to C.G.R. - MeV. Heavy metal separation from wastes employing irradiation. 4,187,176, Cl. 210-151.000.

LeVasseur, Craig: *See*—
Tichenor, Clyde L.; and LeVasseur, Craig, 4,187,534, Cl. 362-268.000.

Lever Brothers Company: *See*—
Becker, Gert; Schilp, Ulrich; and Barth, Hans F., 4,187,184, Cl. 252-8.800.

Levis, William W., Jr.: *See*—
Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,187,357, Cl. 521-159.000.

Levitt, Charlie M.; and Chatterley, Samuel. Measurement of optical properties. 4,186,838, Cl. 209-581.000.

Lewarchik, Ronald J.: *See*—
Erikson, J. Alden; Lewarchik, Ronald J.; and Birkmeyer, William J., 4,187,380, Cl. 548-310.000.

Lewis, David W.; and Kauzlarich, James J. Porous catheters. 4,186,745, Cl. 128-349.00R.

Lewis, James M.: *See*—
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Lewis, Jay L., to Robertshaw Controls Company. Two-temperature pneumatic thermostat control system and unit therefor. 4,186,875, Cl. 236-47.000.
Lewis Refrigeration Co.: *See*—
AuYoung, David K. Y., 4,186,566, Cl. 62-380.000.
Lievestro, Louis: *See*—
Landis, Delmer H., Jr.; Lozier, Paul W.; Lievestro, Louis; Auxier, Thomas A.; and Starkweather, John H., 4,187,054, Cl. 415-115.000.
Lilly Industries Limited: *See*—
Evans, Delme; Jolley, Michael R. J.; Ross, William J.; and Swann, Brian P., 4,187,232, Cl. 549-69.000.
Lin, Yang-i: *See*—
Child, Ralph G.; Lang, Stanley A., Jr.; Lee, Ving J.; and Lin, Yang-i, 4,187,373, Cl. 542-402.000.
Lindamood, Mason M.: *See*—
Foote, George A.; Lindamood, Mason M.; and Fulcomer, Robert D., 4,187,389, Cl. 174-73.00R.
Linden-Alimak A.B.: *See*—
Boman, Per; and Broms, Bengt, 4,187,041, Cl. 405-263.000.
Lindhag, Carl L., to Boise Cascade Corporation. Facing and journal turning machine. 4,186,630, Cl. 82-4.00C.
Lindner, Robert G.: *See*—
Bracalielly, Albert J.; Kautz, Glenn E.; Lindner, Robert G.; and Davis, Bernard H., 4,187,275, Cl. 264-511.000.
Lindstrum, Alan L.; and Chase, Jay V., to United States of America, Navy. Doppler compensated PSK signal processor. 4,187,491, Cl. 367-125.000.
Linhart, Helmut: *See*—
Zinke, Horst; Lorenz, Hans J.; and Linhart, Helmut, 4,187,212, Cl. 260-45.8NT.
Linsenmann, Don R., to Exxon Research & Engineering Co. Push rods and the like. 4,186,696, Cl. 123-90.610.
Lipe-Rollway Corporation: *See*—
MacKendrick, William J.; and Brown, Harold F., 4,186,826, Cl. 192-13.00R.
Lipert, Peter, to Aero-Hydraulics Corporation. Liquid circulating device. 4,187,263, Cl. 261-77.000.
List, Hans: *See*—
Thien, Gerhard; and Fachbach, Heinz, 4,186,693, Cl. 123-41.120.
Litchfield, Leon G., to L. B. (Plastics) Limited. Drawers. 4,186,979, Cl. 312-333.000.
Literati, Peter N.: *See*—
Takacs, Kalman; Literati, Peter N.; Kiss nee Ajzert, Ilona; Simay, Antal; Szentivanyi, Matyas; Virag, Sandor; and Farago, Katalin, 4,187,220, Cl. 260-239.00B.
Liu, Chia-Seng: *See*—
Kim, Charles W.; Liu, Chia-Seng; and MacDuff, Richard, 4,186,781, Cl. 139-420.00R.
Lockyer, George D., Jr.; Burd, Dennis E.; Sweeney, Richard F.; Sukornick, Bernard; and Ulmer, Harry E., to Allied Chemical Corporation. Cyclization of 1,5-hexadiene to cyclohexene. 4,187,386, Cl. 585-367.000.
Loeb, Carl M., Jr., to Carl M. Loeb Trust. Disintegratable aerodynamic brake. 4,186,900, Cl. 244-113.000.
London Concrete Machinery Co.: *See*—
Pawley, Jess W., 4,187,028, Cl. 366-44.000.
Long Mfg. N. C., Inc.: *See*—
Long, William R., 4,186,881, Cl. 239-198.000.
Long, William R., to Long Mfg. N. C., Inc. Irrigation machine. 4,186,881, Cl. 239-198.000.
Longi, Paolo: *See*—
Giannini, Umberto; Cassata, Antonio; Longi, Paolo; and Mazzocchi, Romano, 4,187,196, Cl. 252-429.00B.
Longsdorf, Ronald W.; and Cutler, Clifford P., to Hallmark Cards, Incorporated. Bell and clapper assembly. 4,186,682, Cl. 116-171.000.
Lonseal Corporation: *See*—
Miura, Nobuo, 4,187,338, Cl. 428-159.000.
Lonser, David E.: *See*—
Ficker, Walter W.; Lonser, David E.; Rance, William G.; Stricker, Alfred A.; and von Kaenel, Walter, 4,186,918, Cl. 271-232.000.
Lorenc, Miroslav: *See*—
Dolezal, Ladislav; Weiss, Frantisek; Stanek, Petr; and Lorenc, Miroslav, 4,186,610, Cl. 73-805.000.
Lorenz, Hans J.: *See*—
Zinke, Horst; Lorenz, Hans J.; and Linhart, Helmut, 4,187,212, Cl. 260-45.8NT.
Lorenz, Kurt: *See*—
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; and Wollenhaupt, Karl-Heinz, 4,187,079, Cl. 44-10.00C.
Lowell, Ross; and Seligman, Marvin H. Lighting arrangement for photographic work including combined spot and flood light luminaire. 4,187,531, Cl. 362-17.000.
Lowry, William C.; and Phipps, William L., to General Electric Company. Compressor bleed biased acceleration schedule. 4,186,556, Cl. 60-39.030.
Lozier, Paul W.: *See*—
Landis, Delmer H., Jr.; Lozier, Paul W.; Lievestro, Louis; Auxier, Thomas A.; and Starkweather, John H., 4,187,054, Cl. 415-115.000.
Lu, Kun-Er; and Tarcza, Walter H., to Corning Glass Works. Method for improving the durability of spontaneous NaF opal glassware. 4,187,094, Cl. 65-30.00R.
Lucarelli, Michael A.: *See*—
Picklesimer, Lewellyn G.; Lucarelli, Michael A.; and Reinhart, Theodore J., Jr., 4,187,359, Cl. 525-6.000.
Lucas Industries Limited: *See*—
Ellis, Arthur J.; and Howarth, Alan, 4,187,060, Cl. 417-490.000.
Flynn, Derek J., 4,186,773, Cl. 137-625.300.
Frankl, George, 4,186,560, Cl. 60-599.000.
Mowbray, Dorian F., 4,186,884, Cl. 239-533.800.
Phoenix, Lancelot; and Eckhoff, Stephen A., 4,186,713, Cl. 123-148.00E.
Sharpe, Raymond, 4,186,616, Cl. 74-200.000.
Warren, John, 4,187,419, Cl. 200-308.000.
Luhowy, Gabriel J., to Harris Corporation. Voice detector circuit. 4,187,396, Cl. 179-1.0SC.
Luk, Kong, to Beecham Group Limited. Antibacterial agents 5R, 2S-hydroxymethyl-3Z (2-hydroxy- or 2-alkoxyethylidene-1-aza-4-oxabicyclo[3,2,0]heptanone. 4,187,228, Cl. 260-245.300.
Luke, Patrick, to Mego Corporation. Kicking doll with detachable trigger means. 4,186,518, Cl. 46-128.000.
Lussi, Andre: *See*—
Rais, Arnold; and Lussi, Andre, 4,186,917, Cl. 269-325.000.
Lutze, Hans; Weidemann, Dieter; and Weisshappel, Helmut, to Daimler-Benz Aktiengesellschaft. Forward longitudinal bearer supported at forward end wall of self-supporting motor vehicle body. 4,186,957, Cl. 296-188.000.
Luzhetsky, Vladimir A.: *See*—
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Lyell, Charlie D., to Lyell, Sharon N., a part interest. Food processor. 4,186,543, Cl. 53-515.000.
Lyell, Sharon N.: *See*—
Lyell, Charlie D., 4,186,543, Cl. 53-515.000.
Lynott, John J.: *See*—
Gilovich, Paul A.; and Lynott, John J., 4,186,977, Cl. 312-215.000.
M. Lowenstein & Sons, Inc.: *See*—
Fouche, Glynn E., Jr., 4,187,332, Cl. 427-47.000.
M. Schaerer A.G.: *See*—
Rais, Arnold; and Lussi, Andre, 4,186,917, Cl. 269-325.000.
M&T Chemicals Inc.: *See*—
Dworkin, Robert D., 4,187,239, Cl. 260-410.600.
Karoly, Gabriel, 4,187,250, Cl. 260-578.000.
MacDuff, Richard: *See*—
Kim, Charles W.; Liu, Chia-Seng; and MacDuff, Richard, 4,186,781, Cl. 139-420.00R.
Machado, Manuel; and Spector, George. Disposable bag mounting for a lawn mower. 4,186,546, Cl. 56-202.000.
Machida, Takeshi: *See*—
Ishii, Tadayoshi; Okura, Zenichi; and Machida, Takeshi, 4,187,020, Cl. 354-195.000.
Machii, Tetsuo; and Sugioka, Shuji, to Tokyo Shibaura Electric Co., Ltd. Semiconductor controlled rectifier. 4,187,515, Cl. 357-39.000.
Machinefabriek W. Hubert & Co. B.V.: *See*—
Sinnema, Hendrik, 4,187,268, Cl. 264-151.000.
Mack, Mark P., to Conoco, Inc. Rapid phase transformation for polybutene-1. 4,187,158, Cl. 204-159.200.
MacKendrick, William J.; and Brown, Harold F., to Lipe-Rollway Corporation. Torque limiting clutch brake. 4,186,826, Cl. 192-13.00R.
Mada, Mitsuo: *See*—
Mutai, Masahiko; Mada, Mitsuo; and Shimada, Kiyohiro, 4,187,321, Cl. 426-43.000.
Madaliev, Shavkat: *See*—
Bekbulatov, Ildgam A.; Mamatov, Juldash; Varlamov, Gennady D.; Madaliev, Shavkat; and Gaibov, Valery M., 4,187,368, Cl. 525-503.000.
Madden, Mark R.: *See*—
Jacobi, Edgar F.; and Madden, Mark R., 4,186,880, Cl. 239-177.000.
Madgavkar, Ajay M.; Vogel, Roger F.; and Swift, Harold E., to Gulf Research and Development Company. In situ combustion process for the recovery of liquid carbonaceous fuels from subterranean formations. 4,186,801, Cl. 166-256.000.
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Fabula, Andrew G.; Green, James H.; and Madison, William F., 4,186,679, Cl. 114-20.00R.
Madonna, Donna L.: *See*—
Frankfort, Roberta L.; and Madonna, Donna L., 4,186,859, Cl. 224-205.000.
Maender, Otto W.; and Wilder, Gene R., to Monsanto Company. Promoting the reaction of sodium salts of formyl derivatives of aromatic amines to form nitrodiarylamines. 4,187,249, Cl. 260-576.000.
Maer, Newton K., Jr.: *See*—
Jahns, Hans O.; and Maer, Newton K., Jr., 4,187,039, Cl. 405-217.000.
Mahar, Joseph A., to Mahar & Parsons. Gasoline pump assembly and lock arrangement especially suitable for use therewith. 4,186,850, Cl. 222-28.000.
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Maher, Thomas K., to CPC International Inc. Starch coating pigment for paper. 4,187,219, Cl. 260-17.4ST.
Mair, Alex C.; and Mair, Stephen A., to General Motors Corporation. Method for precise fitting of motor vehicle front end sheet metal. 4,186,476, Cl. 29-407.000.
Mair, Stephen A.: *See*—
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Majors, Vence V. Crane for handling fireplace or wood stove logs. 4,186,839, Cl. 212-135.000.

Mallory, Lewis B.; and Dean, Bob W. Method and apparatus for controlling forced air heating and/or cooling. 4,186,655, Cl. 98-1.000.

Maloney-Crawford Corporation: *See*—
Hodgson, Robert A., 4,187,088, Cl. 55-169.000.

Maloney-Crawford Tank Corporation: *See*—
Hodgson, Robert A., 4,187,089, Cl. 55-219.000.

Maloney, Willard S. Expandable fish lure. 4,186,509, Cl. 43-36.000.

Mamatov, Juldash: *See*—
Bekbulatov, Ildgam A.; Mamatov, Juldash; Varlamov, Gennady D.; Madaliev, Shavkat; and Gaibov, Valery M., 4,187,368, Cl. 525-503.000.

Man Design Co., Ltd.: *See*—
Mogaki, Tadahisa, 4,186,733, Cl. 128-32.000.

Maney, Thomas P. Adjustable paper cap. 4,186,446, Cl. 2-197.000.

Mangold, Dietrich: *See*—
Goetz, Norbert; Mangold, Dietrich; and Zeeh, Bernd, 4,187,227, Cl. 548-226.000.

Manning, Jim L. Safety lock. 4,186,465, Cl. 24-201.0HH.

Marcum, Maxie G., Jr., to Aluminum Industries, Inc. Panel of siding. 4,186,538, Cl. 52-521.000.

Marcus, Bertram J., to G&W Laboratories, Inc. Contraceptive suppository. 4,187,286, Cl. 424-44.000.

Margolin, Amikam: *See*—
Alper, Yekutiel; and Margolin, Amikam, 4,186,520, Cl. 47-1.00R.

Marissal, Janine, to Biotherm. Cosmetic composition for the skin. 4,187,291, Cl. 424-94.000.

Marko, John J., Jr., to General Motors Corporation. Welded lap joint and method of making the same. 4,187,407, Cl. 219-91.200.

Markwald, David B.: *See*—
Anderson, William B.; and Markwald, David B., 4,187,488, Cl. 367-13.000.

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Katsumoto, Kiyoshi; and Marquis, David M., 4,187,235, Cl. 260-346.750.

Marrujo, Ralph G.; and Hire, Thomas D., to Fairchild Industries, Inc. Seat armrest. 4,186,964, Cl. 297-422.000.

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DeWeese, Eugene R., Jr.; and Marsh, Lynn W., Jr., 4,187,393, Cl. 178-22.000.

Marshall, Preston F., to Kendall Company, The. Apparatus for making biaxially oriented nonwoven fabrics and method of making same. 4,186,463, Cl. 19-304.000.

Marshall, Richard A.; Smith, Edwin S.; and Cich, Frank A., to Goodyear Tire & Rubber Company, The. Vinyl chloride polymerization method. 4,187,363, Cl. 526-208.000.

Marston Excelsior Limited: *See*—
Warne, Michael A., 4,187,164, Cl. 204-196.000.

Martin, Anthony N., to United Technologies Corporation. Stepper motor feedback in position servo loop. 4,187,455, Cl. 318-594.000.

Martin, Carl D. Adjustable charging bar. 4,186,646, Cl. 86-29.000.

Martin-Copeland Company: *See*—
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Martin, James C.: *See*—
Irick, Gether, Jr.; Kelly, Charles A.; and Martin, James C., 4,187,229, Cl. 548-260.000.

Martin, Jean-Claude; and Perotto, Jean F., to Centre Electronique Horloger SA. Timing device. 4,187,518, Cl. 358-93.000.

Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, to Abbott Laboratories. 3-De-O-methyl-2-N-acyl and alkyl fortimicins A and B. 4,187,297, Cl. 424-180.000.

Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, to Abbott Laboratories. 2'N-acyl and alkyl fortimicin B and derivatives, 4,2'-N,N'diacyl and dialkyl fortimicin B derivatives 4-N-acyl-2'-N-alkyl and 4-N-alkyl-2'-N-acyl fortimicin B derivatives. 4,187,298, Cl. 424-180.000.

Martin, Jerry R.: *See*—
Tadanier, John S.; and Martin, Jerry R., 4,187,296, Cl. 424-180.000.

Martin, Merritt W., Jr., to Roman Machine Co. Blow molding machine. 4,187,070, Cl. 425-525.000.

Martynova, Marina A.: *See*—
Kabanov, Viktor A.; Martynova, Marina A.; Pluzhnov, Stanislav K.; and Smetanjuk, Vladimir I., 4,187,197, Cl. 252-431.00P.

Marumo, Nagayuki: *See*—
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Maruoka, Hiroyuki, to Nissan Motor Company, Limited. Mass flow measuring apparatus. 4,186,601, Cl. 73-194.00F.

Marvin Glass & Associates: *See*—
Breslow, Jeffrey D.; and Jaworski, Eugene, 4,186,927, Cl. 273-357.000.
Kulesza, Ralph J.; and Breslow, Jeffrey D., 4,186,926, Cl. 273-340.000.

Maschinenfabrik Benninger AG: *See*—
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Mascia, Carmen T.: *See*—
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Mashiko, Kimio: *See*—
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Mashimo, Yukio: *See*—
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,187,019, Cl. 354-33.000.

Maso-Therm Corporation: *See*—
Piazza, Matthew R., 4,186,536, Cl. 52-309.120.

Massok, Anthony J., Jr.; and Nolan, James P., to Dayco Corporation. Construction for absorbing odors caused by perspiration and method of making same. 4,186,499, Cl. 36-44.000.

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Rogers, Ronald A.; Wright, Ansel J.; and Wright, William H., 4,186,659, Cl. 101-47.000.

Materiel et Auxiliaire de Signalisation et de Controle pour l'Automation: *See*—
Bourigault, Raymond, 4,186,605, Cl. 73-341.000.

Mathews, Carl F.; Deverell, Christopher; Pears, Gordon E. A.; and Knowles, Peter G., to Imperial Chemical Industries Limited. Voided films of polyester with polyolefin particles. 4,187,113, Cl. 430-533.000.

Matlin, Joel: *See*—
Katsof, Barry; and Matlin, Joel, 4,187,015, Cl. 354-109.000.

Matoba, Takao: *See*—
Kuroi, Hisashi; Miyajima, Masayoshi; and Matoba, Takao, 4,187,448, Cl. 315-176.000.

Matrosov, Evgeny A.: *See*—
Shikhirev, Boris N.; Matrosov, Evgeny A.; and Deresh, Ilya A., 4,187,081, Cl. 51-23.000.

Matson, Stephen L.: *See*—
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Matsuda, Shimpei; Kato, Akira; Uno, Shigeo; and Nakajima, Fumito, to Babcock-Hitachi K.K.; and Hitachi, Ltd. Process for treating a waste gas containing sulfur oxides. 4,187,282, Cl. 423-244.000.

Matsumoto, Hiromitsu, to Yamaha Hatsukoki Kabushiki Kaisha. Induction system for internal combustion engine. 4,186,706, Cl. 123-127.000.

Matsumoto, Jun, to Aiphone Co., Ltd. Method of controlling channel assignment in a time division multiplexing network. 4,187,401, Cl. 179-15.0BW.

Matsumoto, Jun, to Aiphone Co., Ltd. Method of controlling channel assignment in a time division multiplexing network. 4,187,402, Cl. 179-15.0BW.

Matsumoto, Kazumasa, to Sanyo Kiki Kabushiki Kaisha. Hydraulic control apparatus. 4,186,771, Cl. 137-596.170.

Matsumoto, Yasuhiro: *See*—
Yamamoto, Yasunobu; Tomikawa, Ryoichi; Sakabe, Toshiaki; and Matsumoto, Yasuhiro, 4,187,133, Cl. 156-166.000.

Matsunaga, Shoichi; Siozaki, Fumio; and Aiba, Masahiko, to Sharp Kabushiki Kaisha. Ink liquid supply system for an ink jet system printer. 4,187,512, Cl. 346-140.00R.

Matsushita Electric Industrial Co., Ltd.: *See*—
Hamane, Tokuhito; Kinoshita Toshio; and Kihira, Masafumi, 4,186,478, Cl. 29-596.000.

Mattila, Alvin J. Electronic dipstick. 4,186,604, Cl. 73-295.000.

Matveev, Vyacheslav N.: *See*—
Eroshkin, Nikolai A.; Ivannikov, Alfred V.; Matveev, Vyacheslav N.; and Sergienko, Anatoly I., 4,187,410, Cl. 219-137.200.

Mautz, Karlheinz: *See*—
Schwarz, Alois; Mautz, Karlheinz; and Frommlet, Hubert, 4,186,975, Cl. 308-187.000.

Maxfield, Thomas G.; and Witmore, Ronald K., to Bell Telephone Laboratories, Incorporated. Call state processor for a time division switching system. 4,187,399, Cl. 179-15.0BY.

Mayer, Karl H.; Heitzer, Helmut; Hoffmeister, Friedrich; Heise, Arend; and Kazda, Stanislav, to Bayer Aktiengesellschaft. Benzodiazepinediones, a process for their production and their use as medicaments. 4,187,306, Cl. 424-251.000.

Maylahn, Donald J.: *See*—
Schleicher, Thomas R.; Maylahn, Donald J.; and Drennan, Denis B., 4,186,738, Cl. 128-153.000.

Maynard, Tony E.: *See*—
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Mazzocchi, Romano: *See*—
Giannini, Umberto; Cassata, Antonio; Longi, Paolo; and Mazzocchi, Romano, 4,187,196, Cl. 252-429.00B.

McAlpine, James B.: *See*—
Carney, Ronald E.; McAlpine, James B.; and Perun, Thomas J., 4,187,372, Cl. 536-17.00R.

McConnel, Tim, to International Drum Corporation. Means for securing the bottom closure of a polygonal container. 4,186,865, Cl. 229-5.700.

McConnellogue, Neal J., to Entech Corporation. Method of making easy-open, push-tab end for metal containers. 4,186,678, Cl. 113-121.00C.

McGibbon, William: *See*—
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McGill, Kenneth H.: *See*—
Parker, Curtis J.; and McGill, Kenneth H., 4,187,059, Cl. 417-454.000.

McGraw-Edison Company: *See*—
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McIntyre, James A.; and Phillips, Robert F., to Dow Chemical Company, The. Porous catalyzed electrode provision and technique. 4,187,350, Cl. 429-45.000.

McKillip, William J.: *See—*
Langer, Heimo J.; and McKillip, William J., 4,187,349, Cl. 428-395.000.
McKinney, Charles N.: *See—*
Radd, Fred J.; Oertle, Don H.; and McKinney, Charles N., 4,187,126, Cl. 148-1.500.
McKnight, Robert J. Remote control TV channel selector. 4,186,611, Cl. 74-10.00A.
McLaughlin, Robert L.; and Wood, Donald C., to DeSoto, Inc. Low phosphate content dishwashing detergent. 4,187,190, Cl. 252-99.000.
McMullen, John C.: *See—*
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McNeill Corporation: *See—*
Wegmann, Jerome B., 4,186,821, Cl. 184-7.00D.
McQuillan, Robert C.: *See—*
Hug, William F.; Hamerdinger, Randolph W.; Dunn, Phillip D.; and McQuillan, Robert C., 4,187,474, Cl. 331-94.50D.
McVicker, Gary B., to Exxon Research & Engineering Co. Hydrocarbon conversion processes utilizing supported heteronuclear cluster complex catalysts. 4,187,168, Cl. 208-139.000.
Mead Corporation, The: *See—*
Wood, Prentice J., 4,186,867, Cl. 229-40.000.
Means, Howard W.; and Allick, Edward. Vehicle locking device. 4,186,576, Cl. 70-233.000.
Meeker, Paul K. Car seat support and restraining stand. 4,186,962, Cl. 297-250.000.
Meeks, Marion; and Narra, R. K., to E. R. Squibb & Sons, Inc. Microaggregated albumin. 4,187,285, Cl. 424-1.000.
Mego Corporation: *See—*
Luke, Patrick, 4,186,518, Cl. 46-128.000.
Megumi, Koichi; Kozuka, Hirotsugu; Kobayashi, Masayoshi; and Furuhata, Yoshio, to Hitachi, Ltd. Strontium barium niobate single crystal doped with Ce. 4,187,109, Cl. 430-2.000.
Mehlman, Stewart K.: *See—*
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Merck & Co., Inc.: *See—*
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Rolleston, Richard E.; and Nadeau, Jacques A., 4,187,284, Cl. 424-1.000.
Mercurio, Richard N.; and Graham, Richard B., to Dresser Industries, Inc. Connector for catenary conveyor belt idler rolls. 4,186,831, Cl. 198-501.000.
Merlo, Fabrizio; Bornengo, Giorgio; and Paffoni, Camillo, to Montedison S.p.A. Water-soluble acid azo dye. 4,187,218, Cl. 260-158.000.
Merlo, Werner O.: *See—*
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Merrell Toraude et Compagnie: *See—*
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Merten, Helmut L.; and Wilder, Gene R., to Monsanto Company. Making a nitrodiarylamine by reacting an alkali metal salt of a formamide with a nitrohaloarene. 4,187,248, Cl. 260-576.000.
Merten, Rudolf: *See—*
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Messerschmitt-Boelkow-Blohm GmbH: *See—*
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Metallgesellschaft Aktiengesellschaft: *See—*
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Metcalf, Brian W.; and Jung, Michel, to Merrell Toraude et Compagnie. Substituted 1,5-cyclohexadiene carboxylic acid derivatives. 4,187,316, Cl. 424-305.000.
Metz, Curtis F., III: *See—*
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Micetich, Ronald G.; Fortier, Robert A.; Shaw, Chia C.; and Merlo, Werner O., to Connlab Holdings Limited. Process for preparing azetidinones. 4,187,221, Cl. 260-239.00A.
Michaels of Oregon Co.: *See—*
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Miciukiewicz, Joseph F., to Pitney-Bowes Inc. Document handling apparatus. 4,186,919, Cl. 271-267.000.
Midland-Ross Corporation: *See—*
Cantrell, Henry L., 4,187,504, Cl. 340-652.000.
Milberger, Walter E.; and Wright, Larry G., to United States of America, Army. Constant power regenerative magnetic switching regulator. 4,187,458, Cl. 323-17.000.
Mileham, Jay R., to NRD, Division of Mark IV Industries, Inc. Source holder for mounting radioactive foil and holder-foil assembly. 4,187,432, Cl. 250-493.000.
Miller, Charles H.: *See—*
Shortway, Harry A.; Graham, Alan A.; and Miller, Charles H., 4,187,131, Cl. 156-79.000.
Miller, Dennis P., to Dow Chemical Company, The. Electrical device containing a halogenated alkanoate dielectric fluid. 4,187,188, Cl. 252-65.000.
Miller, Harry B., to Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft. Mechanism and method for transferring yarn from a full package to an empty bobbin. 4,186,890, Cl. 242-18.00A.
Miller, John: *See—*
Blatter, Albert; and Miller, John, 4,186,602, Cl. 73-228.000.
Miller, Stephen H.: *See—*
Covington, Roger G.; Miller, Stephen H.; and Tucker, Archie J., 4,187,077, Cl. 422-63.000.
Milliken, Paul E., to Goodyear Aerospace Corporation. Brake adjuster having reshapable member drawn through a die. 4,186,825, Cl. 188-196.00R.
Minke, Otto; and Lanfermann, Willy, to Ruhrkohle, A.G. Sectional conveyor with sectional rack fixed on the conveyor at only a single location. 4,186,970, Cl. 299-43.000.
Minnesota Mining and Manufacturing Company: *See—*
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Misinya, Inta P.: *See—*
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Mitani, Tatsuro: *See—*
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Mitchell, Howard E., to Dresser Industries, Inc. Steep angle raise bit. 4,186,809, Cl. 175-334.000.
Mitchell, Walter A. Low tire pressure warning system. 4,187,495, Cl. 340-58.000.
Mitchell, William E. Portable spring tester. 4,186,594, Cl. 73-118.000.
Mitsui Toatsu Chemical, Inc.: *See—*
Iwao, Tetsuya; Sasaki, Heizo; Ito, Akira; and Kono, Masahiro, 4,187,385, Cl. 526-128.000.
Miura, Nobuo, to Lonseal Corporation. Method for producing a foamed body having chemically embossed patterns. 4,187,338, Cl. 428-159.000.
Miyagi, Morio: *See—*
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Miyajima, Masayoshi: *See—*
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Miyazaki, Yasushi: *See—*
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Mizelle, Ned W., to Hoover Universal, Inc. Convertible vehicle seat. 4,186,960, Cl. 297-63.000.
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Mizuno, Haruyuki; Idemoto, Atsushi; and Horie, Kunihiro, to Japan Steel Works, Ltd., The. Die for producing plastic resin pellets. 4,187,067, Cl. 425-313.000.
Mizuno, Masao: *See—*
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Mobil Oil Corporation: *See—*
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Moehling, Charles: *See—*
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Moeller, Dale O.: *See—*
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Mogaki, Tadahisa, to Man Design Co., Ltd. Pneumatic massage machine. 4,186,733, Cl. 128-32.000.
Molded Materials Company, Div. Carlisle Corporation: *See—*
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Molins Limited: *See—*
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Moncheaux, Michel: *See—*
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Mondshine, Thomas C., to Texas Brine Corporation. Well completion and work over method. 4,186,803, Cl. 166-292.000.
Monsanto Company: *See—*
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D'Amico, John J., 4,187,097, Cl. 71-90.000.
Franz, John E.; and Howe, Robert K., 4,187,099, Cl. 71-90.000.
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Maender, Otto W.; and Wilder, Gene R., 4,187,249, Cl. 260-576.000.
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Morley, Colin A.; Thomas, Richard N.; and Kollar, Bela, to Smiths Industries Limited. Display apparatus. 4,187,505, Cl. 340-753.000.
Morley, Edward G.: *See*—
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Moroz, Jury A.: *See*—
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Morriss, James W., to Hunt Electronics, Inc. Power control unit. 4,187,528, Cl. 361-399.000.
Morschl, Paul; and Zimmer, Erich, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Process for recovering useable products from by-product ammonium nitrate formed in the manufacture of nuclear reactor fuels or breeder materials. 4,187,280, Cl. 423-15.000.
Morton, Virgil R., to Verco Manufacturing, Inc. Shear load resistant structure. 4,186,535, Cl. 52-250.000.
Moser, Ludwig M., to Siemens Aktiengesellschaft. Hearing aid with digital processing for: correlation of signals from plural microphones, dynamic range control, or filtering using an erasable memory. 4,187,413, Cl. 179-107.0FD.
Motorola, Inc.: *See*—
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Mountz, Elton E., to Morgan Trailer Mfg. Transverse interlock floors for trucks and the like. 4,186,537, Cl. 52-483.000.
Mowbray, Dorian F., to Lucas Industries Limited. Liquid fuel injection nozzles. 4,186,884, Cl. 239-533.800.
Mueller, Helga: *See*—
Joerg, Manfred, 4,186,711, Cl. 123-148.0CC.
Mueller, Norman P.; and Mutafelija, Boris A., to Westinghouse Electric Corp. Nuclear reactor power supply. 4,187,144, Cl. 176-24.000.
Mueller, Werner, to Siemens Aktiengesellschaft. Circuit arrangement for unilaterally scanning distorted teletype characters. 4,187,438, Cl. 307-268.000.
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Yamada, Takeo; Ando, Seigo; Miyashita, Yoshio; Murakami, Katsuhiko; Tate, Masahisa; and Mizui, Kiyoshi, 4,186,792, Cl. 164-150.000.
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Ohara, Isamu; Muranaka, Tsutomu; and Eizumi, Hideo, 4,187,484, Cl. 335-75.000.
Muroi, Sankichi, to Tozen Sangyo Co., Ltd. Water hammer shock absorber. 4,186,775, Cl. 138-30.000.
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Mueller, Norman P.; and Mutafelija, Boris A., 4,187,144, Cl. 176-24.000.
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Myers, Melvin. Air ventilation system. 4,186,564, Cl. 62-180.000.
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Popiel, Stanley; DuBois, R. Clark; Carley, Jay L.; and Hamma, John C., 4,186,837, Cl. 209-565.000.
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Gross, Benjamin; Jacob, Solomon M.; Nace, Donald M.; and Voltz, Sterling E., 4,187,548, Cl. 364-578.000.
Nadeau, Jacques A.: *See*—
Rolleston, Richard E.; and Nadeau, Jacques A., 4,187,284, Cl. 424-1.000.
Naffier, Vernon H. Electronic candle. 4,187,532, Cl. 362-186.000.
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Beverly, Frank O.; and Nagel, Karl H., 4,187,502, Cl. 340-566.000.
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Ishizuka, Kohei; Takasaki, Yoshitaka; Kita, Yasuhiro; Nagoya, Yoshinori; and Kusama, Takeo, 4,187,479, Cl. 333-28.00R.
Nagura, Yukihiro; and Toda, Yoshihiko, to Tokyo Shibaura Denki Kabushiki Kaisha. Ground fault protective apparatus of field windings. 4,187,525, Cl. 361-42.000.
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Aoki, Eiichiro; and Nakada, Akira, 4,186,635, Cl. 84-1.010.
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Nakajima, Fumito: *See*—
Matsuda, Shimpei; Kato, Akira; Uno, Shigeo; and Nakajima, Fumito, 4,187,282, Cl. 423-244.000.
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Ishigaki, Hisao; Tanaka, Ryuzo; and Nakamima, Koichi, 4,186,552, Cl. 58-88.00W.
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Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,187,019, Cl. 354-33.000.
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Meeks, Marion; and Narra, R. K., 4,187,285, Cl. 424-1.000.
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Kaufman, Arnold S.; and Anderson, Robert L., 4,186,727, Cl. 126-299.00D.
National Starch and Chemical Corporation: *See*—
Fernandez, Julio A., 4,187,072, Cl. 8-6.500.
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Sladkoshteev, Vladimir T.; Shatagin, Oleg A.; Khalemsky, Samuil F.; and Besedina, Eleonora B., 4,186,791, Cl. 164-66.000.
NDT Systems, Inc.: *See*—
Thompson, Carroll R., 4,187,425, Cl. 250-358.00P.
Needham, Donald G.; and Griffin, Ray D., to Phillips Petroleum Company. Fire retardant adhesive polyolefin compositions. 4,187,214, Cl. 260-45.9KA.
Neidell, Saul, to Premier Athletic Products Corp. Flip-down sunglasses. 4,187,006, Cl. 351-44.000.
Nelson, David H., to American Solar. Solar energy collector. 4,186,724, Cl. 126-443.000.
Nelson, G. Douglas, to Monsanto Company. Stabilization of solutions containing active chlorine. 4,187,293, Cl. 424-149.000.
Nelson Industries, Inc.: *See*—
Nostrand, William G., 4,187,136, Cl. 156-192.000.
Ness, Irving S., to Johnson & Johnson. Separability member to allow disposable diaper openings and re-fastenings. 4,186,744, Cl. 128-287.000.
Nessi, Aurindo: *See*—
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Neuspiel, Peter J.: *See*—
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Newbery, John L.: *See*—
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Neyer, Jean-Marie: *See*—
Bujadoux, Karel; Neyer, Jean-Marie; and Houzeaux, Jean-Pierre, 4,187,254, Cl. 260-665.00G.
Ni-Tec, Inc.: *See*—
Wolski, Adolph, 4,186,980, Cl. 316-19.000.
Nickell, Larry C.: *See*—
Wilson, Marlin V.; Nickell, Lawrence C.; and Nickell, Larry C., 4,186,898, Cl. 242-152.100.
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Nickerson, James H. D.; and Steel, Robert R., to Foster Wheeler Limited. Slab header. 4,186,799, Cl. 165-176.000.
Nidola, Antonio: *See*—
de Nora, Vittorio; Spaziante, Placido M.; and Nidola, Antonio, 4,187,155, Cl. 204-67.000.
Nielsen, Richard B.; and Vogelsang, Charles J., to Grefco, Inc. Diatomaceous earth filteraid and method for its manufacture. 4,187,174, Cl. 210-32.000.
Nielsen, Robert C., to Dow Chemical Company, The. Radiation curable vinyl ester resin. 4,187,257, Cl. 525-445.000.
Nihon Nousan Kougyou Co., Ltd.: *See*—
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Nihon Parkerizing Co., Ltd.: *See—*
Yashiro, Kuniji; Ayano, Yukihiko; and Miyazaki, Yasushi, 4,187,127, Cl. 148-6.15R.
Nijholt, Meinardus A. G.: *See—*
Govaert, George A.; Nijholt, Meinardus A. G.; and Rodenburg, Lammert, 4,187,536, Cl. 363-21.000.
Nilsson, Kai: *See—*
Johannisson, Tom; Nilsson, Kai; Sjoblom, Rolf; and Widell, Marja, 4,186,582, Cl. 72-60.000.
Ninneman, Lawrence D.: *See—*
Fisher, Philip H.; and Ninneman, Lawrence D., 4,187,267, Cl. 264-40.100.
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Aoki, Eiichiro; and Nakada, Akira, 4,186,635, Cl. 84-1.010.
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Iijima, Masakatu, 4,186,638, Cl. 84-1.010.
Kurosaki, Makoto, 4,186,644, Cl. 84-422.00R.
Takamura, Masayuki; Shinoda, Norio; Kurahashi, Kazuo; and Hatae, Masataka, 4,186,586, Cl. 72-264.000.
Nippon Kogaku K.K.: *See—*
Ishizaka, Sunao, 4,187,016, Cl. 354-152.000.
Shimizu, Yoshiyuki; and Sudo, Takeshi, 4,186,993, Cl. 350-91.000.
Watanabe, Sakuji, 4,187,017, Cl. 354-173.000.
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Shibuya, Teiji; Ishikawa, Yasuaki; Saito, Masayuki; and Ueda, Kiyoharu, 4,187,085, Cl. 55-4.000.
Yamada, Takeo; Ando, Seigo; Miyashita, Yoshio; Murakami, Katsuhiko; Tate, Masahisa; and Mizui, Kiyoshi, 4,186,792, Cl. 164-150.000.
Nippon Oil and Fats Company, Limited: *See—*
Shimizu, Hirozumi; Igarashi, Taizo; Ishizaki, Takaharu; Koma, Toshio; and Takahashi, Hideki, 4,187,078, Cl. 44-51.000.
Nippon Soda Company, Ltd.: *See—*
Ikura, Katsuyata; Katsuura, Kiyoshi; and Kataoka, Masaaki, 4,187,302, Cl. 424-245.000.
Nippon Telegraph and Telephone Public Corporation: *See—*
Hatano, Yoshio; Nonogaki, Saburo; Horigome, Shinkichi; and Sugawara, Shungo, 4,187,205, Cl. 260-30.40A.
Nippon Zeon Co. Ltd.: *See—*
Joh, Yasushi, 4,187,180, Cl. 210-321.00R.
Nischwitz, Ehrenfried: *See—*
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Nishibe, Kouji; and Kondo, Nobuaki, to Kabushiki Kaisha Kawai Gakki Seisakusho. Apparatus for chorus effect in electronic musical instruments. 4,186,643, Cl. 84-1.240.
Nishiwaki, Osamu: *See—*
Tanaka, Kunihiko; Kurita, Masaru; and Nishiwaki, Osamu, 4,187,374, Cl. 544-28.000.
Nishizawa, Masahiro: *See—*
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Nissan Motor Company, Limited: *See—*
Aoyama, Syunichi, 4,186,698, Cl. 123-119.00A.
Aoyama, Syunichi, 4,186,699, Cl. 123-119.00A.
Iizuka, Haruhiko; and Marumo, Nagayuki, 4,186,715, Cl. 123-198.00F.
Koseki, Shyushi, 4,186,694, Cl. 123-41.310.
Maruoka, Hiroyuki, 4,186,601, Cl. 73-194.00F.
Suzuki, Suzuo; Hata, Yoshitaka; and Ohnishi, Akihiro, 4,186,701, Cl. 123-119.00A.
Takase, Sadao; and Asano, Masaharu, 4,186,691, Cl. 123-32.0EL.
Nissen, Alex; and Charles, Distel, to Videon, S.A. Winding device. 4,186,619, Cl. 74-414.000.
Nixon, Larry R., to Aeroquip Corporation. Radial compression gasket. 4,186,947, Cl. 285-112.000.
Noguchi, Satoshi: *See—*
Oishi, Rokuji; Okajima, Yasuharu; Noguchi, Satoshi; and Akeyoshi, Kazuyuki, 4,187,340, Cl. 428-210.000.
Noguchi, Takaharu; Ketori, Takao; Tamura, Kohji; Oi, Tetsu; and Miyoshi, Yutaka, to Hitachi, Ltd. Method for fabrication of rear chip for hall effect magnetic head. 4,186,481, Cl. 29-603.000.
Nolan, James P.: *See—*
Massok, Anthony J., Jr.; and Nolan, James P., 4,186,499, Cl. 36-44.000.
Nolan, Richard A.: *See—*
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Noller, Hans G. Method of analyzing biological, liquid specimens for antigens or antibodies. 4,187,075, Cl. 23-230.00B.
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Hatano, Yoshio; Nonogaki, Saburo; Horigome, Shinkichi; and Sugawara, Shungo, 4,187,205, Cl. 260-30.40A.
Norfleet, James: *See—*
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Norlin Industries, Inc.: *See—*
Gross, Glenn, 4,186,642, Cl. 84-1.240.
Swain, Richard S.; and Moore, Douglas R., 4,186,637, Cl. 84-1.010.
Norris, Alan H.: *See—*
Chambley, Phillip W.; and Norris, Alan H., 4,186,549, Cl. 57-293.000.
Norton Company: *See—*
Fredriksson, John I., 4,187,344, Cl. 428-304.000.
Nostrand, William G., to Nelson Industries, Inc. Method of making a graduated density liquid filter element. 4,187,136, Cl. 156-192.000.
nova, Anastasia I-vanovna Roma, administratrix: *See—*
Gorodissky, Leonid G.; Vasilieva, Raisa V.; Zhmurov, Vyacheslav I.; Kozlov, Mikhail D.; Kuzmina, Vera I.; and Romanov, Nikolai T., deceased, 4,186,571, Cl. 68-5.00E.
Novello, Frederick C.: *See—*
Cragoe, Edward J., Jr.; Novello, Frederick C.; and Saari, Walfred S., 4,187,315, Cl. 424-305.000.
Nowak, Klaus F.; and Braun, Stephen A., to Deere & Company. Exhaust system for a two-stroke engine. 4,186,819, Cl. 181-265.000.
Noyes, Richard C.; and Zaman, Shakir U., to Combustion Engineering, Inc. Hydraulic latch scram release mechanism. 4,187,145, Cl. 176-36.00R.
NRD, Division of Mark IV Industries, Inc.: *See—*
Mileham, Jay R., 4,187,432, Cl. 250-493.000.
Numata, Hiroshi; Otani, Akihiko; and Mizuno, Masao, to Omron Tateisi Electronics Co. Moving object detection system. 4,187,487, Cl. 367-93.000.
Nunokawa, Kazuo: *See—*
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Nuss, George W., Jr.; Santora, Norman J.; and Douglas, George H., to William H. Rorer, Inc. Sunscreen and erythema treating with N-benzylidene anilenes. 4,187,317, Cl. 424-309.000.
Nutter, Geoffrey; and McGibbon, William, to Ferranti Limited. Apparatus for writing data in unique order into and retrieving same from memory. 4,187,551, Cl. 364-900.000.
NYBY Bruk AB: *See—*
Jonsson, Arne, 4,186,475, Cl. 138-97.000.
O'Connor, Daniel P., to Ellcon-National, Inc. Closure latch mechanism with closing pressure cam. 4,186,953, Cl. 292-210.000.
Oertle, Don H.: *See—*
Radd, Fred J.; Oertle, Don H.; and McKinney, Charles N., 4,187,126, Cl. 148-1.500.
Offenstadt, Eric; and Houze, Michel. Front suspension, in particular for a vehicle having two wheels and vehicle provided with said suspension. 4,186,936, Cl. 280-277.000.
Ogawa, Iwakichi, to Takara Co., Ltd. Toy horse vehicle. 4,186,515, Cl. 46-22.000.
Ogura, Iwao: *See—*
Ueyama, Takehiko; Nishizawa, Masahiro; Yamazaki, Eiichi; and Ogura, Iwao, 4,187,012, Cl. 354-1.000.
Ohara, Isamu; Muranaka, Tsutomu; and Eizumi, Hideo, to Omron Tateisi Electronics Co. Timing device utilizing a unique clutch assembly. 4,187,484, Cl. 335-75.000.
Ohkawa, Motokazu: *See—*
Endoh, Kenjiro; Ohkawa, Motokazu; Kitagawa, Kazuo; and Kira, Hideshi, 4,187,477, Cl. 333-14.000.
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Ohnishi, Akihiro: *See—*
Suzuki, Suzuo; Hata, Yoshitaka; and Ohnishi, Akihiro, 4,186,701, Cl. 123-119.00A.
Ohta, Hideo: *See—*
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Ohtaki, Shyohei: *See—*
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,187,019, Cl. 354-33.000.
Oi, Tetsu: *See—*
Noguchi, Takaharu; Ketori, Takao; Tamura, Kohji; Oi, Tetsu; and Miyoshi, Yutaka, 4,186,481, Cl. 29-603.000.
Oishi, Rokuji; Okajima, Yasuharu; Noguchi, Satoshi; and Akeyoshi, Kazuyuki, to Asahi Glass Company, Ltd. Method of forming patterned transparent electro-conductive film on the substrate of liquid crystal display. 4,187,340, Cl. 428-210.000.
Okada, Akihiro, to Itoki Kosakusho Co., Ltd. Fabricated desk. 4,186,976, Cl. 312-194.000.
Okajima, Yasuharu: *See—*
Oishi, Rokuji; Okajima, Yasuharu; Noguchi, Satoshi; and Akeyoshi, Kazuyuki, 4,187,340, Cl. 428-210.000.
Okamuro, James A., to Borroughs Tool & Equipment Corporation. Belt tension gauge. 4,186,598, Cl. 73-144.000.
Okolischan, Anton. Fascia-protecting drip-diverting device. 4,186,531, Cl. 52-11.000.
Okura, Zenichi: *See—*
Ishii, Tadayoshi; Okura, Zenichi; and Machida, Takeshi, 4,187,020, Cl. 354-195.000.
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., to Hewlett-Packard Company. Programmable calculator including means for controllably introducing blank lines on a printed record during program execution. 4,187,547, Cl. 364-710.000.
Olander, Walter K.: *See—*
Banucci, Eugene G.; and Olander, Walter K., 4,187,361, Cl. 525-4.000.
Ole Gunnar Selvaag: *See—*
Ottersen, Odd; Solvang, Egil S.; and Rosjo, Endre, 4,186,764, Cl. 137-414.000.
Olender, Leonty A.: *See—*
Yascheritsyn, Petr I.; Sakulevich, Faddei J.; Olender, Leonty A.; and Kosobutsky, Alexandr A., 4,186,528, Cl. 51-161.000.
Olesch, Reinhard G.; and Rittenbach, Otto E., to United States of America, Army. Electronic intruder detection system. 4,187,501, Cl. 340-554.000.

Olinkraft, Inc.: *See*—
Jacalone, Richard P.; and Poggiali, Lewis D., 4,186,846, Cl. 220-468.000.
Olsson, Ray: *See*—
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Omori, Yoshitaka, to Honda Giken Kogyo Kabushiki Kaisha. Closure cap device for a fuel tank of a motorcycle. 4,186,843, Cl. 220-210.000.
Omron Tateisi Electronics Co.: *See*—
Numata, Hiroshi; Otani, Akihiko; and Mizuno, Masao, 4,187,487, Cl. 367-93.000.
Ohara, Isamu; Muranaka, Tsutomu; and Eizumi, Hideo, 4,187,484, Cl. 335-75.000.
Onaka, Tatsumi: *See*—
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Oney, Wilford R., to General Electric Company. High power density brushless dc motor. 4,187,441, Cl. 310-112.000.
Oonuma, Kiyoshi: *See*—
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Opelika Manufacturing Corp.: *See*—
Burton, Perry E., 4,186,672, Cl. 112-273.000.
Oquita, Ramiro. Slip-knot pinata. 4,186,514, Cl. 46-11.000.
Ore-Ida Foods, Inc.: *See*—
Wassmer, Norman B.; and Hodges, Joseph L., 4,186,836, Cl. 209-565.000.
Orion Machinery and Engineering Corporation: *See*—
Steinhilber, Wilhelm A., 4,186,861, Cl. 226-118.000.
Otani, Akihiko: *See*—
Numata, Hiroshi; Otani, Akihiko; and Mizuno, Masao, 4,187,487, Cl. 367-93.000.
Otisca Industries, Ltd.: *See*—
Keller, Douglas V., Jr.; and Rainis, Andrew, 4,186,887, Cl. 241-20.000.
Ottersen, Odd; Solvang, Egil S.; and Rosjo, Endre, to Ole Gunnar Selvaag. Valve for controlling liquid flow. 4,186,764, Cl. 137-414.000.
Otto Bock Orthopadische Industrie KG: *See*—
Horvath, Eduard, 4,186,449, Cl. 3-2.000.
Ovodenko, Alexandr V.: *See*—
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Owens-Illinois, Inc.: *See*—
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Fisher, Philip H.; and Ninneman, Lawrence D., 4,187,267, Cl. 264-40.100.
Owl-Cam Inc.: *See*—
Campbell, Maury B., 4,186,955, Cl. 294-1.00R.
Ownby, James C.: *See*—
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OY Tampella AB: *See*—
Rimpi, Pertti K., 4,187,279, Cl. 422-185.000.
Oyagi, Kenzi, to Takeda Chemical Industries, Ltd. Apparatus for vacuum-sealing a vial. 4,186,542, Cl. 53-88.000.
P. R. Mallory & Co. Inc.: *See*—
Kaye, Gordon E., 4,186,983, Cl. 339-91.00R.
Pactra Industries, Inc.: *See*—
Howard, Jerald D., 4,187,204, Cl. 260-22.0CB.
Paffoni, Camillo: *See*—
Merlo, Fabrizio; Bornengo, Giorgio; and Paffoni, Camillo, 4,187,218, Cl. 260-158.000.
Pall Corporation: *See*—
Rosenberg, David J., 4,187,182, Cl. 210-445.000.
Palmaer, Tore G. Ear protector attachment for a helmet. 4,186,447, Cl. 2-423.000.
Palmaer, Tore G. Skylight operating means. 4,186,523, Cl. 49-209.000.
Palmatier, Roland T.; and Sciulli, Francis J., to Harris Corporation. Apparatus for determining image areas for printing with correction for extraneous matter. 4,187,435, Cl. 250-559.000.
Pansing, Joseph C.: *See*—
Geisler, Russell W.; and Geisler, Walter H., 4,186,873, Cl. 236-44.00A.
Papst-Motoren KG: *See*—
von der Heide, Johann, 4,187,456, Cl. 318-616.000.
Paris, Gerard Y.; Cimon, Denis G.; Bariana, Dilbagh S.; and Fung, Anthony, to Abbott Laboratories. Diuretics. 4,187,307, Cl. 424-251.000.
Park, Jack H.; and Hunter, Walter D., to Texaco Development Corporation. Oil recovery process using oxyalkylated additives. 4,187,185, Cl. 252-8.55D.
Parker, Curtis J.; and McGill, Kenneth H., to Dresser Industries, Inc. Valve guide for poppet valve. 4,187,059, Cl. 417-454.000.
Parker, Roger A.: *See*—
Blohm, Thomas R.; Grisar, J. Martin; and Parker, Roger A., 4,187,319, Cl. 424-333.000.
Parmer, Jerome F., to General Dynamics Corporation. Electrical lead for cryogenic devices. 4,187,387, Cl. 174-15.0CA.
Pasco, Wayne D.: *See*—
Greskovich, Charles D.; Klug, Frederic J.; and Pasco, Wayne D., 4,187,266, Cl. 264-43.000.
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Pekarsky, Mark M.: *See*—
Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M., 4,186,793, Cl. 164-158.000.
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Wedlake, Roger J.; and Penny, Anthony L., 4,187,083, Cl. 51-307.000.
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Steiger, Fred H., 4,186,743, Cl. 128-284.000.
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Cantor, Burton M., 4,186,851, Cl. 222-113.000.
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Carney, Ronald E.; McAlpine, James B.; and Perun, Thomas J., 4,187,372, Cl. 536-17.00R.
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Petersen, Larry C.: *See*—
Ehrhardt, Henry B., 4,187,423, Cl. 250-312.000.
Peterson, Charles A., to Westinghouse Electric Corp. Series capacitor protection equpment with extended range dual sparkover feature. 4,187,524, Cl. 361-16.000.
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Knappe, LaVerne F.; Peterson, Roger H.; and Stroebel, Gary J., 4,187,452, Cl. 318-128.000.
Petitpierre, Jean C., to Ciba-Geigy Corporation. Pressure-sensitive or heat-sensitive recording material and novel 2,2-diarylchromeno compounds used therein. 4,187,233, Cl. 260-345.200.
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Darms, Roland; Pfeifer, Josef; and Kvita, Vratislav, 4,187,364, Cl. 526-259.000.
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Hromatka, Otto; Binder, Dieter; Zeller, Paul; and Pfister, Rudolf, 4,187,303, Cl. 424-246.000.
Pfundstein, Donald K., to Deere & Company. Supplementary hydrostatic drive electronic control. 4,186,816, Cl. 180-243.000.
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Ball, Donald H.; and Voelkers, James D., 4,187,542, Cl. 364-502.000.
Campbell, Robert W., 4,187,371, Cl. 528-340.000.
Cobb, Raymond L., 4,187,231, Cl. 260-332.100.
Davis, Thomas T.; and Burk, Marvin C., 4,187,540, Cl. 364-200.000.
Needham, Donald G.; and Griffin, Ray D., 4,187,214, Cl. 260-45.9KA.
Peters, Thomas A., 4,187,360, Cl. 525-339.000.
Porter, Grady T.; Fuller, Edward N.; and Roof, Lewis B., 4,186,607, Cl. 73-422.0GC.
Schaffer, Arnold M.; and Favre, John A., 4,187,026, Cl. 356-326.000.
Stoller, Frederick L., 4,186,470, Cl. 28-112.000.
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McIntyre, James A.; and Phillips, Robert F., 4,187,350, Cl. 429-45.000.
Phinney, Thomas L.: *See*—
Douglas, Robert H.; and Phinney, Thomas L., 4,187,538, Cl. 364-200.000.
Phipps, William L.: *See*—
Lowry, William C.; and Phipps, William L., 4,186,556, Cl. 60-39.030.
Phoenix, Lancelot; and Eckhoff, Stephen A., to Lucas Industries Limited. Ignition systems for internal combustion engine. 4,186,713, Cl. 123-148.00E.
Piazza, Matthew R., to Maso-Therm Corporation. Composite building module and method for making same. 4,186,536, Cl. 52-309.120.
Piber, Earl T., to Eaton Corporation. Rocker switch with selective lockout means shiftable transversely of the pivotal axis. 4,187,420, Cl. 200-321.000.
Pickelman, Dale M.; Foster, William A.; and Wessling, Ritchie A., to Dow Chemical Company, The. Method for forming high strength composites. 4,187,142, Cl. 162-146.000.
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Pillars, Arthur W. Locking-ball for trailer hitch. 4,186,940, Cl. 280-507.000.
Pitner, Gerald A.: *See*—
Wallace, John M.; and Pitner, Gerald A., 4,187,545, Cl. 364-559.000.
Pitney-Bowes, Inc.: *See*—
Godley, William P., 4,187,030, Cl. 366-319.000.
Miciukiewicz, Joseph F., 4,186,919, Cl. 271-267.000.
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Boratgis, James P.; and Pittman, Earle S., 4,187,093, Cl. 62-126.000.
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Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,187,357, Cl. 521-159.000.
Platell, Ove B. Heat-exchanger. 4,186,795, Cl. 165-53.000.
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Platzoder, Karl, to Siemens Aktiengesellschaft. Semiconductor component. 4,187,517, Cl. 357-64.000.
Pless, Janos; and Sandrin, Edmond, to Sandoz Ltd. Organic compounds. 4,187,295, Cl. 424-177.000.
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Burton, Geoffrey W.; and Morley, Edward G., 4,186,929, Cl. 277-27.000.
Pletz, Alfred, Jr.: *See*—
Wigley, Patrick A.; Dana, Edwin L.; and Pletz, Alfred, Jr., 4,187,535, Cl. 363-16.000.
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Kabanov, Viktor A.; Martynova, Marina A.; Pluzhnov, Stanislav K.; and Smetanjuk, Vladimir I., 4,187,197, Cl. 252-431.00P.
Pochwalski, Krzysztof K.; and Radoszewski, Tomasz E., to InstytutBadan Jadrowych. Method and apparatus for absolute activity determination of radionuclides. 4,187,428, Cl. 250-366.000.
Podd, Victor T. Container liner. 4,186,845, Cl. 220-461.000.
Poggiali, Lewis D.: *See*—
Jacalone, Richard P.; and Poggiali, Lewis D., 4,186,846, Cl. 220-468.000.
Pokrandt, Glenn C., to Falk Corporation, The. Shear pin coupling. 4,186,570, Cl. 64-28.00R.
Polaroid Corporation: *See*—
Bader, Henry; and Feingold, Michael H., 4,187,225, Cl. 260-239.900.
Stella, Joseph A., 4,187,009, Cl. 352-130.000.
Pommier, Jean, to Compagnie Generale des Etablissements Michelin. Pneumatic tire. 4,186,788, Cl. 152-209.00B.
Ponpon, Jean-Pierre: *See*—
Muller, Jean-Claude; Ponpon, Jean-Pierre; Kurek, Joseph; and Siffert, Paul, 4,187,124, Cl. 148-1.500.
Popiel, Stanley; DuBois, R. Clark; Carley, Jay L.; and Hamma, John C., to Mystic Color Lab, Inc. Automated film cartridge and mailer sorting and correlating apparatus. 4,186,837, Cl. 209-565.000.
Porter, Grady T.; Fuller, Edward N.; and Roof, Lewis B., to Phillips Petroleum Company. Liquid sample dilution system. 4,186,607, Cl. 73-422.0GC.
Possell, Clarence R. Power producing constant speed turbine. 4,186,554, Cl. 60-39.370.
Post, Gerald G., to Abbott Laboratories. Fortimicin E. 4,187,299, Cl. 424-181.000.
Powers, Edmund M., to United States of America, Army. IMViC test method. 4,187,351, Cl. 435-38.000.
Powers, John V.: *See*—
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PPG Industries, Inc.: *See*—
Erikson, J. Alden; Lewarchik, Ronald J.; and Birkmeyer, William J., 4,187,380, Cl. 548-310.000.
Frank, Robert G., 4,187,095, Cl. 65-104.000.
Friedlander, Charles B.; and McMullen, John C., 4,187,366, Cl. 528-75.000.
Pater, Frank R., Jr.; and Kapusnik, Joseph M., 4,187,434, Cl. 250-515.000.
Sickles, James E., 4,186,886, Cl. 239-691.000.
Simon, Martin J., 4,187,258, Cl. 525-157.000.
Pratt, Ronald G.: *See*—
Brice, John C.; Hill, Owen F.; and Pratt, Ronald G., 4,187,139, Cl. 156-600.000.
Premier Athletic Products Corp.: *See*—
Neidell, Saul, 4,187,006, Cl. 351-44.000.
Presta, John C.: *See*—
Yates, Derek N.; and Presta, John C., 4,187,135, Cl. 156-187.000.
Preston, Gary W.; Johannesen, Donald D.; and Kestermeier, William J., to Bendix Corporation, The. Anti-rattle spring for disc brake. 4,186,824, Cl. 188-73.500.
Principe, Joseph R.: *See*—
Schreiber, Ronald S.; and Principe, Joseph R., 4,187,287, Cl. 424-49.000.
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Puglia, Wayne J.: *See*—
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Shaffer, Gary W.; and Purzycki, Kenneth L., 4,187,243, Cl. 260-464.000.
Puschner, Herbert A.; and Lembens, Helmut, to Hoechst Aktiengesellschaft. Device for fusing and fixing a toner image on a carrier. 4,187,405, Cl. 219-10.55A.
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Datsenko, Nikolai M.; Pushanko, Nikolai N.; and Yarmilko, Vladimir G., 4,187,172, Cl. 209-44.300.
Pusnes Mek, Verksted A/S: *See*—
Sandoy, Harry S., 4,186,464, Cl. 24-116.00R.
Putimtsev, Boris N.: *See*—
Khomich, Nikolai S.; Sakulevich, Faddei J.; Putimtsev, Boris N.; and Silaev, Vladimir A., 4,187,084, Cl. 51-308.000.
Quebec Iron and Titanium Corporation - fer et Titane du Quebec, Inc.: *See*—
Gueguin, Michel, 4,187,117, Cl. 106-56.000.
Quenot, Michel C. A., to Stanley-Mabo. Tape-type linear measuring instrument. 4,186,490, Cl. 33-139.000.
Query, Grady W. Dishwashing apparatus. 4,187,122, Cl. 134-95.000.
Quinlan, Patrick M., to Petrolite Corporation. Process of inhibiting corrosion with quaternaries of halogen derivatives of alkynoxymethyl amines. 4,187,277, Cl. 422-16.000.
Quinn, Rex B.: *See*—
United States of America, National Aeronautics and Space Administration; Clauss, Robert C.; and Quinn, Rex B., 4,187,470, Cl. 330-4.000.
Rabischong, Pierre: *See*—
Peruchon Edouard; and Rabischong, Pierre, 4,186,494, Cl. 33-178.00E.
Radd, Fred J.; Oertle, Don H.; and McKinney, Charles N., to Conoco, Inc. Growth-orientation of crystals by raster scanning electron beam. 4,187,126, Cl. 148-1.500.
Rader, Charles W.: *See*—
Khuntia, Natabara; and Rader, Charles W., 4,186,822, Cl. 188-1.00A.
Radice, Angelo: *See*—
Villa, Enrico; and Radice, Angelo, 4,186,676, Cl. 112-165.000.

Radosevich, Lawrence D.: *See—*
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Radoszewski, Tomasz E.: *See—*
Pochwalski, Krzysztof K.; and Radoszewski, Tomasz E., 4,187,428, Cl. 250-366.000.

Radwill, Robert P.; and Moehling, Charles, to AMSTED Industries Incorporated. Dual rate spring device for railroad car trucks. 4,186,914, Cl. 267-4.000.

Rainis, Andrew: *See—*
Keller, Douglas V., Jr.; and Rainis, Andrew, 4,186,887, Cl. 241-20.000.

Rais, Arnold; and Lussi, Andre, to M. Schaerer A.G. Operating table for medical purposes. 4,186,917, Cl. 269-325.000.

Ramesohl, Hubert: *See—*
Brachthauser, Kunibert; Ramesohl, Hubert; Beisner, Klaus; and Herchenbach, Horst, 4,187,071, Cl. 432-106.000.

Ramsey, Charles W.: *See—*
Pearce, Warren, Jr.; and Ramsey, Charles W., 4,186,987, Cl. 339-116.00C.

Rance, William G.: *See—*
Ficker, Walter W.; Lonser, David E.; Rance, William G.; Stricker, Alfred A.; and von Kaenel, Walter, 4,186,918, Cl. 271-232.000.

Ranco Incorporated: *See—*
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Ransburg Corporation: *See—*
Bentley, Stanley L., 4,187,527, Cl. 361-235.000.

Rasheed, Khalid; and Warkentin, James D., to Ansul Company, The. Biocidally-active 1,3-benzodithiole-2-thione compounds. 4,187,096, Cl. 71-90.000.

Raytheon Company: *See—*
Feist, Wolfgang M., 4,187,125, Cl. 148-1.500.
Legat, Wilhelm H.; Taft, Keith G.; and Tiefert, Karl H., 4,187,516, Cl. 357-60.000.

RCA Corporation: *See—*
D'Amato, Ralph J.; and Nolan, Richard A., 4,187,443, Cl. 313-402.000.

Reade, Richard F., to Corning Glass Works. Anorthite glass-ceramics. 4,187,115, Cl. 106-39.800.

Reavis, Robert P., Jr.; Soderstrom, Melvin A.; and Vachhani, Vasantrai A., to AMP Incorporated. Strain relief cover for a barrel terminal. 4,186,984, Cl. 339-103.00R.

Reba, Imants, to Crown Zellerbach Corporation. Web threading system. 4,186,860, Cl. 226-91.000.

Redmore, Derek; and Welge, Frederick T., to Petrolite Corporation. Hydroxypropylene-amino-phosphonic-sulfonic acids. 4,187,245, Cl. 260-502.500.

Redmore, Derek, to Petrolite Corporation. Preparation of pyridyl-4-phosphonates. 4,187,378, Cl. 546-21.000.

Redwitz Baker Incorporated: *See—*
Redwitz, Robert F.; and Baker, William G., 4,187,001, Cl. 350-202.000.

Redwitz, Robert F.; and Baker, William G., to Redwitz Baker Incorporated. View expanding apparatus. 4,187,001, Cl. 350-202.000.

Reichle, Peter: *See—*
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Reijonen, Veli E., to VYR-Metoder AB. Procedure for separating and recovering marsh gas. 4,187,148, Cl. 48-197.00R.

Reinhart, Theodore J., Jr.: *See—*
Picklesimer, Lewellyn G.; Lucarelli, Michael A.; and Reinhart, Theodore J., Jr., 4,187,359, Cl. 525-6.000.

Reinmoller, Adolf; Voss, Hans W.; and Kluting, Bernd, to Keiper Automobiltechnik GmbH & Co. KG. Adjustable motor vehicle seat. 4,186,904, Cl. 248-395.000.

Reisman, Arnold: *See—*
Berkenblit, Melvin; and Reisman, Arnold, 4,187,140, Cl. 156-662.000.

Rembaum, Alan; Yen, Shiao-Ping S.; and Klein, Elias, to California Institute of Technology. Ion-exchange hollow fibers. 4,187,333, Cl. 427-230.000.

Remberg, Horst; and Frischmann, Werner. Apparatus for freeze drying of gas, especially compressed air. 4,186,495, Cl. 34-92.000.

Renaud, Pierre J., to Societe Anonyme Francaise du Ferodo. Clutch release bearings. 4,186,828, Cl. 192-98.000.

Repka, David F. CB vehicle toy. 4,186,519, Cl. 46-202.000.

Repski, Pete. Ground working implement. 4,186,805, Cl. 172-248.000.

Rexnord Inc.: *See—*
Haker, Edwin J.; Riddle, Charles F.; and Bielinski, Ralph F., 4,187,036, Cl. 404-117.000.

Rhone-Poulenc Industries: *See—*
Cerny, Jacqueline; and Troncy, Robert, 4,187,207, Cl. 260-37.00N.

Rich, Jay. Distilled water apparatus. 4,187,150, Cl. 202-182.000.

Richards, Elmer A., to Eaton Corporation. Transmission input decelerating and reversing mechanism. 4,186,618, Cl. 74-339.000.

Richardson-Merrell Inc.: *See—*
Blohm, Thomas R.; Grisar, J. Martin; and Parker, Roger A., 4,187,319, Cl. 424-333.000.

Ricoh Co., Ltd.: *See—*
Koide, Hiroshi; Watanabe, Junichi; and Tenmyo, Shigemoto, 4,186,991, Cl. 350-6.910.
Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; Tabata, Yasuhiro; and Kaneko, Tamaki, 4,187,024, Cl. 355-14.00R.

Riddle, Charles F.: *See—*
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Rimpi, Pertti K., to OY Tampella AB. Device for recovering sodium chemicals from green liquor and flue gases. 4,187,279, Cl. 422-185.000.

Ripley, Ian S.: *See—*
Hepworth, Paul; and Ripley, Ian S., 4,187,362, Cl. 526-73.000.

Rittenbach, Otto E.: *See—*
Olesch, Reinhard G.; and Rittenbach, Otto E., 4,187,501, Cl. 340-554.000.

Robert Bosch GmbH: *See—*
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Robert Filter Manufacturing Company: *See—*
Roberts, Charles V.; Sarra, William F.; and Neuspiel, Peter J., 4,187,175, Cl. 210-80.000.

Roberts, Charles V.; Sarra, William F.; and Neuspiel, Peter J., to Robert Filter Manufacturing Company. Treatment facility with backwash control system. 4,187,175, Cl. 210-80.000.

Roberts, Joseph A., to Advanced Circuit Technology. Circuit board with self-locking terminals. 4,187,388, Cl. 174-68.500.

Roberts, Noel A.: *See—*
Hassall, Cedric H.; Johnson, William H.; and Roberts, Noel A., 4,187,216, Cl. 260-112.50R.

Roberts, Patrick S., to Thomas International Corporation. Digital chord generation for electronic musical instruments. 4,186,636, Cl. 84-1.010.

Robertshaw Controls Company: *See—*
Hardin, George T., 4,186,762, Cl. 137-343.000.
Lewis, Jay L., 4,186,875, Cl. 236-47.000.

Robinson, Alan V.; and Chapman, John, to Camrex Research and Development, Ltd. Formulation and manufacture of antifouling compositions. 4,187,211, Cl. 260-42.440.

Robinson, Don: *See—*
Goldfarb, Adolph E.; Benkoe, Erwin, deceased; and Robinson, Don, 4,186,925, Cl. 273-389.000.

Robinson, John W.; and Dietrich, Ralph N., to Kimball International, Inc. Rhythm generator for electronic organ. 4,186,639, Cl. 84-1.030.

Robinson, Prentice, to Centronics Data Computer Corp. Method and apparatus for filling the movable reservoir of an inkjet printer. 4,187,511, Cl. 346-75.000.

Robling, Marc E., to Essex Group, Inc. Electromagnetic fuel injection valve with swirl means. 4,186,883, Cl. 239-491.000.

Rockwell International Corporation: *See—*
Cummings, Forest M., 4,187,467, Cl. 325-133.000.
Vitols, Visvaldis A.; and White, Stanley A., 4,187,519, Cl. 358-169.000.

Rockwell-Rimoldi, S.p.A.: *See—*
Villa, Enrico; and Radice, Angelo, 4,186,676, Cl. 112-165.000.

Rodenburg, Lammert: *See—*
Govaert, George A.; Nijholt, Meinardus A. G.; and Rodenburg, Lammert, 4,187,536, Cl. 363-21.000.

Rodondi, Andrew F.; and Rossi, Alfred V., to General Motors Corporation. Female terminal for printed circuits. 4,186,989, Cl. 339-258.00R.

Rodriques, John J.: *See—*
Stevenson, James S.; and Rodriques, John J., 4,186,759, Cl. 137-240.000.

Rogers, Ronald A.; Wright, Ansel J.; and Wright, William H., to Master Addresser Company. Machine for addressing cards and envelopes. 4,186,659, Cl. 101-47.000.

Rohm GmbH: *See—*
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Rolair Systems, Inc.: *See—*
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Rolleston, Richard E.; and Nadeau, Jacques A., to Merck & Co., Inc. Skeletal imaging kit utilizing triethylene tetramine hexa (methylene phosphonic acid). 4,187,284, Cl. 424-1.000.

Rolm Corporation: *See—*
Kasson, James M.; and Graham, Martin H., 4,187,466, Cl. 325-42.000.

Rolston, J. Albert; and Philipps, Thomas E., to Owens-Corning Fiberglas Corporation. Method of making same. 4,187,271, Cl. 264-258.000.

Roltra S.p.A.: *See—*
Brusasco, Enzo, 4,186,620, Cl. 74-424.80R.
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Romageon, Roland H. Anti-slip underlay. 4,187,337, Cl. 428-95.000.

Roman Machine Co.: *See—*
Martin, Merritt W., Jr., 4,187,070, Cl. 425-525.000.
Perez, Julio C., 4,187,065, Cl. 425-136.000.

Romanov, Nikolai T., deceased: *See—*
Gorodissky, Leonid G.; Vasilieva, Raisa V.; Zhmurov, Vyacheslav I.; Kozlov, Mikhail D.; Kuzmina, Vera I.; and Romanov, Nikolai T., deceased, 4,186,571, Cl. 68-5.00E.

Romanski, Eric R.: *See—*
Josef, Michael J.; and Romanski, Eric R., 4,186,780, Cl. 139-383.00A.

Roof, Lewis B.: *See—*
Porter, Grady T.; Fuller, Edward N.; and Roof, Lewis B., 4,186,607, Cl. 73-422.0GC.

Ropte, Eckhard: *See—*
Sander, Bruno; Scherling, Kurt; Steinberger, Rolf; and Ropte, Eckhard, 4,187,143, Cl. 162-157.00R.

Rosemount Inc.: *See—*
Dageforde, Allen F., 4,187,162, Cl. 204-195.00P.
Frick, Roger L., 4,186,599, Cl. 73-194.0VS.

Rosen, Perry: *See*—
Holland, George W.; Jernow, Jane L.; and Rosen, Perry, 4,187,381, Cl. 560-121.000.

Rosenberg, David J., to Pall Corporation. Box filter. 4,187,182, Cl. 210-445.000.

Rosenberg, Ralf H. S.; and Ferm, Morgan H. O., to IFO Sanitar AB. Bidet arrangement. 4,186,450, Cl. 4-6.000.

Rosenberg, Sanders D.: *See*—
Bost, John J.; Cabeal, Jackie A.; and Rosenberg, Sanders D., 4,187,129, Cl. 149-21.000.

Rosenberger, Harold E., to Bausch & Lomb Incorporated. Microscope support system for use in examining eyes in vivo and enucleated. 4,187,005, Cl. 351-38.000.

Rosjo, Endre: *See*—
Ottersen, Odd; Solvang, Egil S.; and Rosjo, Endre, 4,186,764, Cl. 137-414.000.

Ross, Joseph A.: *See*—
Di Matteo, Paul L.; Ross, Joseph A.; Stern, Howard K.; and Waszak, Lawrence, 4,187,011, Cl. 353-122.000.

Ross, William J.: *See*—
Evans, Delme; Jolley, Michael R. J.; Ross, William J.; and Swann, Brian P., 4,187,232, Cl. 549-69.000.

Rossi, Alfred V.: *See*—
Rodondi, Andrew F.; and Rossi, Alfred V., 4,186,989, Cl. 339-258.00R.

Roth, David W. H., Jr.; and Zudkevitch, David, to Allied Chemical Corporation. Extractive distillation for separating ketones and/or alcohols from phenol and/or cresol. 4,187,152, Cl. 203-62.000.

Rotter, Gerhard; and Schomann, Klaus D., to BASF Aktiengesellschaft. DC erase head. 4,187,521, Cl. 360-118.000.

Rough, J. Kirkwood H., to Zegeer, Jim, a part interest. Electric motor drive system. 4,187,453, Cl. 318-135.000.

Roziere, Guy, to Thomson-CSF. Film for correcting spatial irregularity in the gain of optical images of intensifier tubes. 4,187,002, Cl. 350-314.000.

Rubinson & Friends, Inc.: *See*—
Larner, Michael W., 4,187,544, Cl. 364-514.000.

Rudolf Seiz: *See*—
Seiz, Rudolf; and Sebastian, Lothar, 4,187,037, Cl. 405-150.000.

Rudwick, Lawrence A. Three-wheeled vehicle. 4,186,935, Cl. 280-269.000.

Ruegg, Rudolf: *See*—
Bollag, Werner; Ruegg, Rudolf; and Ryser, Gottlieb, 4,187,247, Cl. 260-574.000.

Ruhrkohle, A.G.: *See*—
Minke, Otto; and Lanfermann, Willy, 4,186,970, Cl. 299-43.000.

Runge, Peter K.: *See*—
Denkin, Nathan M.; and Runge, Peter K., 4,186,994, Cl. 350-96.170.

Ruo, Chen-Min. Plastic sanitary pump. 4,186,451, Cl. 4-255.000.

Ruppel, Henry W.: *See*—
Cosman, Dieter; and Ruppel, Kathleen C., 4,186,820, Cl. 182-93.000.

Ruppel, Kathleen C.: *See*—
Cosman, Dieter; and Ruppel, Kathleen C., 4,186,820, Cl. 182-93.000.

Russell, Homer C.: *See*—
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,187,547, Cl. 364-710.000.

Ryser, Gottlieb: *See*—
Bollag, Werner; Ruegg, Rudolf; and Ryser, Gottlieb, 4,187,247, Cl. 260-574.000.

Ryvkis, Yakov M.: *See*—
Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M., 4,186,793, Cl. 164-158.000.

Ryzhnev, Vadim J.: *See*—
Egorov, Alexandr F.; Ryzhnev, Vadim J.; Simonovsky, Dmitry K.; and Sokolov, Valery A., 4,186,590, Cl. 73-23.000.

S. E. Huffman Corporation: *See*—
Huffman, Stanley E., 4,186,529, Cl. 51-288.000.

Saari, Walfred S.: *See*—
Cragoe, Edward J., Jr.; Novello, Frederick C.; and Saari, Walfred S., 4,187,315, Cl. 424-305.000.

Sacchetti, Alfred D. Automatic color bobbin changer. 4,186,677, Cl. 112-186.000.

Safford, Laurance F., to American Standard Inc. Synchronous universal binary scrambler. 4,187,392, Cl. 178-22.000.

Saft-Societe des Accumulateurs Fixes et de Traction: *See*—
Jumel, Yves, 4,187,328, Cl. 427-8.000.

Saint-Gobain Industries: *See*—
Chenel, Pierre; and Moncheaux, Michel, 4,186,685, Cl. 118-410.000.

Saito, Masayuki: *See*—
Shibuya, Teiji; Ishikawa, Yasuaki; Saito, Masayuki; and Ueda, Kiyoharu, 4,187,085, Cl. 55-4.000.

Sakabe, Toshiaki: *See*—
Yamamoto, Yasunobu; Tomikawa, Ryoichi; Sakabe, Toshiaki; and Matsumoto, Yasuhiro, 4,187,133, Cl. 156-166.000.

Sakaguchi, Hirofumi: *See*—
Tarumi, Noriyoshi; Ueno, Kenji; and Sakaguchi, Hirofumi, 4,186,606, Cl. 73-351.000.

Sakulevich, Faddei J.: *See*—
Khomich, Nikolai S.; Sakulevich, Faddei J.; Putimtsev, Boris N.; and Silaev, Vladimir A., 4,187,084, Cl. 51-308.000.
Yascheritsyn, Petr I.; Sakulevich, Faddei J.; Olender, Leonty A.; and Kosobutsky, Alexandr A., 4,186,528, Cl. 51-161.000.

Sakurai, Teruo: *See*—
Takemoto, Nagaaki; Sakurai, Teruo; Mashiko, Kimio; and Tomari, Harumatsu, 4,186,756, Cl. 131-140.00C.

Salee, Gideon, to Hooker Chemicals & Plastics Corp. Polymer blends with improved hydrolytic stability comprising a linear aromatic polyester and a methacrylate cross-linked acrylate copolymer. 4,187,259, Cl. 525-219.000.

Salisbury Special Tool: *See*—
Varga, Paul, 4,186,916, Cl. 269-303.000.

Salomon, Georges P. J., to S.A. Etablissements Francois Salomon & Fils. Ski boot. 4,186,501, Cl. 36-121.000.

Salzman, Otto, to Tyrol Shoe Co. Ltd. Molded cross-country ski boot. 4,186,500, Cl. 36-117.000.

Sandco Limited: *See*—
Guttinger, Manfred; and Schermutzki, Konrad, 4,186,797, Cl. 165-120.000.

Sander, Bruno; Scherling, Kurt; Steinberger, Rolf; and Ropte, Eckhard, to BASF Aktiengesellschaft. Manufacture of fibrids from poly(a-mide-imide) resins. 4,187,143, Cl. 162-157.00R.

Sanders Associates, Inc.: *See*—
Ballard, Samuel S.; and White, Ronald P., 4,187,490, Cl. 367-121.000.

Sandoy, Harry S., to Pusnes Mek, Verksted A/S. Chain stopper. 4,186,464, Cl. 24-116.00R.

Sandoz, Inc.: *See*—
Hardtmann, Goetz E., 4,187,309, Cl. 424-258.000.

Sandoz Ltd.: *See*—
Pless, Janos; and Sandrin, Edmond, 4,187,295, Cl. 424-177.000.

Sandri, Stefano: *See*—
Modena, Giulio; Sandri, Stefano; and Scagliola, Carlo, 4,187,397, Cl. 179-1.0SG.

Sandrin, Edmond: *See*—
Pless, Janos; and Sandrin, Edmond, 4,187,295, Cl. 424-177.000.

Sanford, Richard: *See*—
Bourdon, Normand C.; and Sanford, Richard, 4,187,272, Cl. 264-318.000.

Santora, Norman J.: *See*—
Nuss, George W., Jr.; Santora, Norman J.; and Douglas, George H., 4,187,317, Cl. 424-309.000.

Sanyo Kiki Kabushiki Kaisha: *See*—
Matsumoto, Kazumasa, 4,186,771, Cl. 137-596.170.

Sarra, William F.: *See*—
Roberts, Charles V.; Sarra, William F.; and Neuspiel, Peter J., 4,187,175, Cl. 210-80.000.

Sasaki, Heizo: *See*—
Iwao, Tetsuya; Sasaki, Heizo; Ito, Akira; and Kono, Masahiro, 4,187,385, Cl. 526-128.000.

Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., to Bayer Aktiengesellschaft. 4,5-Dichloro-imidazole-1-carboxylic acid aryl esters and their use as herbicides. 4,187,100, Cl. 71-92.000.

Sasse, Klaus: *See*—
Seng, Florin; Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., 4,187,101, Cl. 71-92.000.

Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; Tabata, Yasuhiro; and Kaneko, Tamaki, to Ricoh Company, Ltd. Electrostatic copying machine. 4,187,024, Cl. 355-14.00R.

Sawruk, Stephen: *See*—
Kokotailo, George T.; and Sawruk, Stephen, 4,187,283, Cl. 423-328.000.

Scagliola, Carlo: *See*—
Modena, Giulio; Sandri, Stefano; and Scagliola, Carlo, 4,187,397, Cl. 179-1.0SG.

Schaffer, Arnold M.; and Favre, John A., to Phillips Petroleum Company. Photoacoustic method and apparatus for measuring intensity of electromagnetic radiation. 4,187,026, Cl. 356-326.000.

Scharf, Lou. Portable arrangement for and method of transferring materials between open-mouthed containers. 4,186,782, Cl. 141-7.000.

Schaufelberger, Arthur H., deceased: *See*—
Crane, Patrick E.; Lazarchik, Robert E.; and Schaufelberger, Arthur H., deceased, 4,187,507, Cl. 343-754.000.

Schaufelberger, Ruth L., administratrix: *See*—
Crane, Patrick E.; Lazarchik, Robert E.; and Schaufelberger, Arthur H., deceased, 4,187,507, Cl. 343-754.000.

Schausberger, Helmut; and Brunner, Rudolf, to AGFA-Gevaert, A.G. Apparatus for wet treatment of running webs of photographic material. 4,187,023, Cl. 354-321.000.

Scheer, Erich, to KUNDO - Kieninger & Obergfell. Electrical programmer for the automatic control of a household appliance. 4,187,499, Cl. 340-309.100.

Schekin, Nikolai G.: *See*—
Tseluiko, Jury I.; Kutsykovich, Dorina B.; Shabelnikova, Ljudmila A.; Kholopov, Vladimir P.; Schekin, Nikolai G.; Gritsuk, Lev D.; and Katsenelenbogen, Leonid B., 4,186,798, Cl. 165-147.000.

Schenker, M. Allan; and Kerstein, Irving J. Access shield for uncovered refrigerated units. 4,186,790, Cl. 160-329.000.

Scherling, Kurt: *See*—
Sander, Bruno; Scherling, Kurt; Steinberger, Rolf; and Ropte, Eckhard, 4,187,143, Cl. 162-157.00R.

Schermutzki, Konrad: *See*—
Guttinger, Manfred; and Schermutzki, Konrad, 4,186,797, Cl. 165-120.000.

Schiessl, Alois: *See*—
Huber, Paul; Schiessl, Alois; and Krone, Hartmut, 4,186,664, Cl. 102-66.000.
Schievelbein, Vernon H., to Texaco Inc. Surfactant flooding oil recovery process. 4,187,073, Cl. 252-8.55D.
Schilling, Paul K.: *See*—
Hobson, John A.; and Schilling, Paul K., 4,187,066, Cl. 425-327.000.
Schilp, Ulrich: *See*—
Becker, Gert; Schilp, Ulrich; and Barth, Hans F., 4,187,184, Cl. 252-8.800.
Schlager, Kenneth J. Thermographic apparatus for physical examination of patients. 4,186,748, Cl. 128-736.000.
Schleicher, Thomas R.; Maylahn, Donald J.; and Drennan, Denis B. Heel supporting boot for bed patients. 4,186,738, Cl. 128-153.000.
Schleifstein, Robert, to Coats & Clark, Inc. Method for making flame retardant-water repellent coil zipper. 4,186,466, Cl. 24-205.13C.
Schleppnik, Alfred A. Malodor counteractants. 4,187,251, Cl. 260-586.00R.
Schmauder, Robert W., Jr.: *See*—
Schmauder, Robert W., Sr.; and Schmauder, Robert W., Jr., 4,186,720, Cl. 126-445.000.
Schmauder, Robert W., Sr.; and Schmauder, Robert W., Jr., to Solar Shelter Engineering Inc. Solar heating panel. 4,186,720, Cl. 126-445.000.
Schmidt, Herbert, to Hauni-Werke Korber & Co. KG. Tobacco drying apparatus. 4,186,755, Cl. 131-135.000.
Schmidt, Martin, to Siemens Aktiengesellschaft. Tomograph for the production of transverse layer images. 4,187,430, Cl. 250-445.00T.
Schmidt, Paul J.; and Hung, William M., to Sterling Drug Inc. 3-[4-(Disubstituted-amino)phenyl]-3-(diphenylamino)phthalides. 4,187,223, Cl. 260-343.30R.
Schmidt, Robert R.: *See*—
Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., 4,187,100, Cl. 71-92.000.
Seng, Florin; Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., 4,187,101, Cl. 71-92.000.
Schneider, Raymond C.; and Pelligrino, Paul A., to Twin Disc, Incorporated. Modulatable power transmission clutch. 4,186,829, Cl. 192-109.00F.
Scholz, Hansjurgen; Brambilla, Luigi; and Backhaus, Hans-Gerd, to Daimler-Benz Aktiengesellschaft. Inflatable impact protection cushion. 4,186,941, Cl. 280-743.000.
Schomann, Klaus D.: *See*—
Rotter, Gerhard; and Schomann, Klaus D., 4,187,521, Cl. 360-118.000.
Schott, Donald E., to Thomas C. Wilson, Inc. Tube expander. 4,186,584, Cl. 72-122.000.
Schrader, Klaus: *See*—
Haker, Rolf; Schrader, Klaus; and Thiery, Joachim, 4,187,462, Cl. 324-204.000.
Schreiber, Ronald S.; and Principe, Joseph R., to Colgate Palmolive Company. Warm two tone flavored dentifrice. 4,187,287, Cl. 424-49.000.
Schroeder, Guenter, to Rohm GmbH. Foamable polymer material. 4,187,353, Cl. 521-149.000.
Schucker, Thomas R., to Allis-Chalmers Corporation. Hydraulic prestressing device for shear lever bolts. 4,187,032, Cl. 403-15.000.
Schultz, Sargent B. Motorcycle backrest device. 4,186,937, Cl. 280-289.00E.
Schulze, James L., Sr., to General Electric Company. Cooling efficiency meter circuit for an air conditioner. 4,186,563, Cl. 62-126.000.
Schumacher, William L., to AMP Incorporated. Light device, lens, and fiber optic package. 4,186,995, Cl. 350-96.200.
Schumacher, William L., to AMP Incorporated. Overlap type waveguide connector assembly and method. 4,186,997, Cl. 350-96.210.
Schwartz, David M. Solar energy collector. 4,186,725, Cl. 126-443.000.
Schwarz, Alois; Mautz, Karlheinz; and Frommlet, Hubert, to Messerschmitt-Boelkow-Blohm GmbH. Bearing seal and lubricating device. 4,186,975, Cl. 308-187.000.
Schwerdt, Paul: *See*—
Bohringer, Karl; Reichle, Peter; and Schwerdt, Paul, 4,186,596, Cl. 73-136.00C.
Schwinn, Joseph M.; and Maynard, Tony E., to Ecodyne Corporation. Fan blade assembly and coupling. 4,187,056, Cl. 416-207.000.
Scientific Technology Inc.: *See*—
Key, Paul F.; and Lazzara, Anthony R., 4,187,421, Cl. 250-199.000.
Sciulli, Francis J.: *See*—
Palmatier, Roland T.; and Sciulli, Francis J., 4,187,435, Cl. 250-559.000.
Scott, David G., to Halliburton Company. Recirculating lubrication system. 4,186,654, Cl. 92-78.000.
Seabrook, Terence D. Multi-purpose pallet. 4,186,667, Cl. 108-53.500.
Searfoss, William H.; and Jones, Gerald P., to Molded Materials Company, Div. Carlisle Corporation. Brake block material. 4,187,209, Cl. 260-38.000.
Sears Manufacturing Company: *See*—
Koutsky, L. John, 4,186,963, Cl. 297-308.000.
Sebastian, Lothar: *See*—
Seiz, Rudolf; and Sebastian, Lothar, 4,187,037, Cl. 405-150.000.
Secoh Giken Inc.: *See*—
Ban, Itsuki; and Kanno, Hidenori, 4,187,522, Cl. 360-137.000.
Seidl, Jiri: *See*—
Gartner, Jurij; and Seidl, Jiri, 4,186,695, Cl. 123-52.00M.
Seiler, John J. Animal grooming tethering device. 4,186,690, Cl. 119-110.000.
Seiz, Rudolf; and Sebastian, Lothar, to Rudolf Seiz. Wall supporting arrangement, especially for supporting mine gallery walls. 4,187,037, Cl. 405-150.000.
Seligman, Marvin H.: *See*—
Lowell, Ross; and Seligman, Marvin H., 4,187,531, Cl. 362-17.000.
Sels, Francis J.: *See*—
Kokelenberg, Hendrik E.; Sels, Francis J.; and Van Veelen, George F., 4,187,114, Cl. 430-510.000.
Seng, Florin; Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., to Bayer Aktiengeselleschaft. 1-Acyloxymethyl-4,5-dichloro-imidazole derivatives and their use as herbicides. 4,187,101, Cl. 71-92.000.
Serafino, James M.; Yadlowsky, Slawko; and Witzeman, John S., to General Foods Corporation. Dry beverage mix containing a clouding agent. 4,187,326, Cl. 426-590.000.
Serebro, Vladimir S.: *See*—
Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M., 4,186,793, Cl. 164-158.000.
Sergienko, Anatoly I.: *See*—
Eroshkin, Nikolai A.; Ivannikov, Alfred V.; Matveev, Vyacheslav N.; and Sergienko, Anatoly I., 4,187,410, Cl. 219-137.200.
Serkes, Ira M.: *See*—
Anshus, Byron E.; Katsumoto, Kiyoshi; and Serkes, Ira M., 4,187,370, Cl. 528-312.000.
Service d'Exploitation Industrielle des Tabacs et des Allumettes: *See*—
Battard, Jean-Claude; and Buisson, Jean, 4,187,119, Cl. 106-126.000.
Bornsztein, Rene, 4,186,757, Cl. 131-149.000.
Shabelnikova, Ljudmila A.: *See*—
Tseluiko, Jury I.; Kutsykovich, Dorina B.; Shabelnikova, Ljudmila A.; Kholopov, Vladimir P.; Schekin, Nikolai G.; Gritsuk, Lev D.; and Katsenelenbogen, Leonid B., 4,186,798, Cl. 165-147.000.
Shaffer, Gary W.; and Purzycki, Kenneth L., to Givaudan Corporation. Novel 2-(2-cyanoethylidene)-bicyclo[2.2.1]hept-5-enes and hydrogenated derivatives thereof. 4,187,243, Cl. 260-464.000.
Shakespeare Company: *See*—
Howald, Arthur M., 4,186,508, Cl. 43-24.000.
Shapiro, Moisei S.: *See*—
Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M., 4,186,793, Cl. 164-158.000.
Sharp Kabushiki Kaisha: *See*—
Matsunaga, Shoichi; Siozaki, Fumio; and Aiba, Masahiko, 4,187,512, Cl. 346-140.00R.
Yano, Kohzo; Hishida, Tadanori; Inami, Yasuhiko; and Wada, Tomio, 4,187,004, Cl. 350-357.000.
Sharpe, Raymond, to Lucas Industries Limited. Variable speed transmission systems. 4,186,616, Cl. 74-200.000.
Shatagin, Oleg A.: *See*—
Sladkoshteev, Vladimir T.; Shatagin, Oleg A.; Khalemsky, Samuil F.; and Besedina, Eleonora B., 4,186,791, Cl. 164-66.000.
Shaw, Chia C.: *See*—
Micetich, Ronald G.; Fortier, Robert A.; Shaw, Chia C.; and Merlo, Werner O., 4,187,221, Cl. 260-239.00A.
Shawke, Jerome R., to Warner & Swasey Company, The. Gauge assembly. 4,186,491, Cl. 33-143.00L.
Shelby-Williams Industries, Inc.: *See*—
Jarrett, George W., 4,187,346, Cl. 428-342.000.
Sheldon, Loren B.: *See*—
Heffernan, James P.; Sheldon, Loren B.; Tomashek, James R.; and Ward, Donald H., 4,187,546, Cl. 364-565.000.
Shen, Ti-Ke; and Coombe, John R., to Westinghouse Electric Corp. Reduction of radioactive emissions from nuclear-reactor plant. 4,187,146, Cl. 176-37.000.
Sheridan, Geoffrey P., to Lankro Chemicals Ltd. Talc dispersions. 4,187,192, Cl. 252-313.00R.
Sherwood, Richard C.: *See*—
Billings, Robert L.; Chen, Ho-Sou; Gyorgy, Ernst M.; and Sherwood, Richard C., 4,187,128, Cl. 148-121.000.
Shibuya, Teiji; Ishikawa, Yasuaki; Saito, Masayuki; and Ueda, Kiyoharu, to Nippon Kokan Kabushiki Kaisha. Treating facility for sintering waste gas. 4,187,085, Cl. 55-4.000.
Shikhirev, Boris N.; Matrosov, Evgeny A.; and Deresh, Ilya A. Apparatus for treatment of sheet material with the use of ferromagnetic powder. 4,187,081, Cl. 51-23.000.
Shimada, Kiyohiro: *See*—
Mutai, Masahiko; Mada, Mitsuo; and Shimada, Kiyohiro, 4,187,321, Cl. 426-43.000.
Shimizu, Hirozumi; Igarashi, Taizo; Ishizaki, Takaharu; Koma, Toshio; and Takahashi, Hideki, to Nippon Oil and Fats Company, Limited. Coal dispersing oil. 4,187,078, Cl. 44-51.000.
Shimizu, Yoshiyuki; and Sudo, Takeshi, to Nippon Kogaku K.K. Epidark illumination system. 4,186,993, Cl. 350-91.000.
Shimoji, Yutaka; and Arai, Youichi, to Fujitsu Limited. Bias circuit. 4,187,471, Cl. 330-277.000.
Shimp, Lawrence A.: *See*—
Lagow, Richard J.; Shimp, Lawrence A.; and Clark, Leland C., Jr., 4,187,252, Cl. 260-653.000.
Shinkawa, Keiro; Shoyama, Hiroji; and Sodeyama, Chuichi, to Hitachi, Ltd. SHF band oscillator circuit using FET. 4,187,476, Cl. 331-117.00D.

Shinoda, Norio: *See—*
Takamura, Masayuki; Shinoda, Norio; Kurahashi, Kazuo; and Hatae, Masataka, 4,186,586, Cl. 72-264.000.
Shirbroun, Darrell B. Soybean beverage. 4,187,324, Cl. 426-460.000.
Shock-M-All, Inc.: *See—*
Berg, Fred W., 4,186,512, Cl. 43-98.000.
Shoemaker, John R., to AMP Incorporated. Sealed splice. 4,186,986, Cl. 339-114.000.
Shorey, Thomas H., to Boeing Company, The. Cargo ramp hoist mechanism. 4,186,901, Cl. 244-137.00R.
Shortway, Harry A.; Graham, Alan A.; and Miller, Charles H., to Congoleum Corporation. Resinous polymer sheet materials having selective, surface decorative effects and methods of making the same. 4,187,131, Cl. 156-79.000.
Shorygina, Natalya V.: *See—*
Pavlikov, Rudolf Z.; Shorygina, Natalya V.; Strupinsky, Vladimir A.; Kruglikov, Anatoly A.; Farbshtein, Jury G.; and Klipinitser, Iosif L., 4,187,369, Cl. 528-137.000.
Shoyama, Hiroji: *See—*
Shinkawa, Keiro; Shoyama, Hiroji; and Sodeyama, Chuichi, 4,187,476, Cl. 331-117.00D.
Shulke, David D., to Caterpillar Tractor Co. Vibration and dust isolation system. 4,186,930, Cl. 277-166.000.
Sickles, James E., to PPG Industries, Inc. Adapting means providing detachable mounting of an induction-charging adapter head on a spray device. 4,186,886, Cl. 239-691.000.
Siemens Aktiengesellschaft: *See—*
Ast, Reinhold, 4,187,403, Cl. 179-84.0VF.
Fahrenschon, Franz; Huettl, Heinz; and Dotzauer, Ewald, 4,187,414, Cl. 179-175.30S.
Garbrecht, Kurt; and Hildebrandt, Bernhard, 4,187,465, Cl. 325-31.000.
Heinze, Klaus D.; and Lange, Gerhard, 4,187,526, Cl. 361-120.000.
Hundt, Eckart, 4,187,431, Cl. 250-492.00A.
Moser, Ludwig M., 4,187,413, Cl. 179-107.0FD.
Mueller, Werner, 4,187,438, Cl. 307-268.000.
Muller, Bruno; and Kohler, Werner, 4,187,437, Cl. 307-147.000.
Platzoder, Karl, 4,187,517, Cl. 357-64.000.
Schmidt, Martin, 4,187,430, Cl. 250-445.00T.
Stark, Anselm, 4,187,398, Cl. 179-2.0EB.
Sievers, Michael W., to United States of America, National Aeronautics and Space Administration. High-speed data link for moderate distances and noisy environments. 4,187,394, Cl. 178-58.00R.
Siffert, Paul: *See—*
Muller, Jean-Claude; Ponpon, Jean-Pierre; Kurek, Joseph; and Siffert, Paul, 4,187,124, Cl. 148-1.500.
Signode Corporation: *See—*
Klaus, Arthur, 4,186,862, Cl. 227-130.000.
Silaev, Vladimir A.: *See—*
Khomich, Nikolai S.; Sakulevich, Faddei J.; Putimtsev, Boris N.; and Silaev, Vladimir A., 4,187,084, Cl. 51-308.000.
Silberg, Paul A. Method and apparatus for propagating electrical signals through a conducting dielectric fluid. 4,187,489, Cl. 340-852.000.
Simay, Antal: *See—*
Takacs, Kalman; Literati, Peter N.; Kiss nee Ajzert, Ilona; Simay, Antal; Szentivanyi, Matyas; Virag, Sandor; and Farago, Katalin, 4,187,220, Cl. 260-239.00B.
Simon, Martin J., to PPG Industries, Inc. Sealerless primers. 4,187,258, Cl. 525-157.000.
Simonovsky, Dmitry K.: *See—*
Egorov, Alexandr F.; Ryzhnev, Vadim J.; Simonovsky, Dmitry K.; and Sokolov, Valery A., 4,186,590, Cl. 73-23.000.
Simons, Craig W., to Amerace Corporation. Snap-lock terminator mounting bracket assembly. 4,186,902, Cl. 248-73.000.
Simpson, George W., Jr., to General Motors Corporation. Photoresist stripper with dodecylsulfonic acid and chlorinated solvents. 4,187,191, Cl. 252-143.000.
Simpson, Loran R.: *See—*
Laube, David E.; and Simpson, Loran R., 4,186,483, Cl. 29-630.00B.
Singer Company, The: *See—*
Zoltan, Bart J., 4,187,422, Cl. 250-203.00R.
Singer Company, The: *See—*
Vartoukian, Artin G., 4,186,673, Cl. 112-121.150.
Singh, Shobha; Van Uitert, LeGrand G.; and Zydzik, George J., to Bell Telephone Laboratories, Incorporated. Structure for solid state switch. 4,187,530, Cl. 361-433.000.
Sinnema, Hendrik, to Machinefabriek W. Hubert & Co. B.V. Method of manufacturing molded articles from a kneadable material, e.g., clay. 4,187,268, Cl. 264-151.000.
Siozaki, Fumio: *See—*
Matsunaga, Shoichi; Siozaki, Fumio; and Aiba, Masahiko, 4,187,512, Cl. 346-140.00R.
Sivachenko, Eugene W. High strength corrugated metal plate and method of fabricating same. 4,186,541, Cl. 52-630.000.
Sjoblom, Rolf: *See—*
Johannisson, Tom; Nilsson, Kai; Sjoblom, Rolf; and Widell, Marja, 4,186,582, Cl. 72-60.000.
Skeist, Merrill S.: *See—*
Gross, Leo; and Skeist, Merrill S., 4,187,446, Cl. 315-58.000.
Skurikhin, Vladimir I.; Fainzilberg, Leonid S.; and Zhitetsky, Leonid S., to Institut Kibernetiki Akademii Nauk Ukrainskoi SSR. Digital analyzer for determining liquidus temperature of metals and alloys. 4,187,541, Cl. 364-497.000.
Slacter, Alan W. Fish lure holder. 4,186,511, Cl. 43-57.50R.
Sladkosh teev, Vladimir T.; Shatagin, Oleg A.; Khalemsky, Samuil F.; and Besedina, Eleonora B., to Ukrainsky Nauchno; and Nauchno Proizvodstvennoe. Process and apparatus for horizontal continuous casting of metal. 4,186,791, Cl. 164-66.000.
Slama, Francis J., to Standard Oil Company (Indiana). Vinyl aromatic polymerization process. 4,187,261, Cl. 525-243.000.
Slater, Norbert G., to Greer, Everett; and Bryan, John F., III, part interest to each. Apparatus for and method of plasma pre-weld and post-weld metal preparation. 4,187,409, Cl. 219-121.00P.
Smetanjuk, Vladimir I.: *See—*
Kabanov, Viktor A.; Martynova, Marina A.; Pluzhnov, Stanislav K.; and Smetanjuk, Vladimir I., 4,187,197, Cl. 252-431.00P.
Smith, Edwin S.: *See—*
Marshall, Richard A.; Smith, Edwin S.; and Cich, Frank A., 4,187,363, Cl. 526-208.000.
Smith, Stanley M.: *See—*
Ehrhardt, Henry B., 4,187,423, Cl. 250-312.000.
SmithKline Corporation: *See—*
Buckley, Thomas F.; and Gleason, John G., 4,187,375, Cl. 544-92.000.
Holden, Kenneth G.; and Yim, Nelson C., 4,187,314, Cl. 424-282.000.
Smiths Industries Limited: *See—*
Morley, Colin A.; Thomas, Richard N.; and Kollar, Bela, 4,187,505, Cl. 340-753.000.
Snezhnoi, Rostislav L.: *See—*
Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M., 4,186,793, Cl. 164-158.000.
Snodgrass, Bert L. Non-weight fishing bait caster. 4,186,907, Cl. 249-94.000.
Snow, John P., to Eaton Corporation. Rotatable hose or tube coupling. 4,186,946, Cl. 285-94.000.
Snyder, David E., to U.S. Industries, Inc. Flow line control system. 4,186,766, Cl. 137-458.000.
Societe Anonyme de Telecommunications: *See—*
Boutmy, Patrick E.; and Camborde, Jean-Marc A., 4,187,415, Cl. 179-175.30F.
S.A. Etablissements Francois Salomon & Fils: *See—*
Salomon, Georges P. J., 4,186,501, Cl. 36-121.000.
Societe Anonyme Francaise du Ferodo: *See—*
Renaud, Pierre J., 4,186,828, Cl. 192-98.000.
Societe Chimique des Charbonnages - CdF Chimie: *See—*
Bujadoux, Karel; Neyer, Jean-Marie; and Houzeaux, Jean-Pierre, 4,187,254, Cl. 260-665.00G.
Societe Nationale Elf Aquitaine (Production): *See—*
Peruchon Edouard; and Rabischong, Pierre, 4,186,494, Cl. 33-178.00E.
Soderstrom, Melvin A.: *See—*
Reavis, Robert P., Jr.; Soderstrom, Melvin A.; and Vachhani, Vasantrai A., 4,186,984, Cl. 339-103.00R.
Sodeyama, Chuichi: *See—*
Shinkawa, Keiro; Shoyama, Hiroji; and Sodeyama, Chuichi, 4,187,476, Cl. 331-117.00D.
Sokolov, Valery A.: *See—*
Egorov, Alexandr F.; Ryzhnev, Vadim J.; Simonovsky, Dmitry K.; and Sokolov, Valery A., 4,186,590, Cl. 73-23.000.
Sola Basic Industries, Inc.: *See—*
Foote, George A.; Lindamood, Mason M.; and Fulcomer, Robert D., 4,187,389, Cl. 174-73.00R.
Solar Shelter Engineering Inc.: *See—*
Schmauder, Robert W., Sr.; and Schmauder, Robert W., Jr., 4,186,720, Cl. 126-445.000.
Solid Photography Inc.: *See—*
Di Matteo, Paul L.; Ross, Joseph A.; Stern, Howard K.; and Waszak, Lawrence, 4,187,011, Cl. 353-122.000.
Solvang, Egil S.: *See—*
Ottersen, Odd; Solvang, Egil S.; and Rosjo, Endre, 4,186,764, Cl. 137-414.000.
Solyanichenko, Nikolai A.: *See—*
Stakhov, Alexei P.; Vishnyakov, Jury M.; Luzhetsky, Vladimir A.; Ovodenko, Alexandr V.; Solyanichenko, Nikolai A.; and Fomichev, Alexandr V., 4,187,500, Cl. 340-347.0DD.
Sommer, Frederick A. Tamper preventing lock. 4,186,578, Cl. 70-419.000.
Southey, Robert G., to Eaton Corporation. Arthritic golf club grip. 4,186,924, Cl. 273-81.400.
Spangler, Searle T. Control circuit for automatically monitoring, dispensing, and filling a liquid in a container. 4,186,849, Cl. 222-25.000.
Spanke, Edwin A., to Gulf & Western Manufacturing Company. Fluid operated clutch and brake. 4,186,827, Cl. 192-18.00A.
Spaziante, Placido M.: *See—*
de Nora, Vittorio; Spaziante, Placido M.; and Nidola, Antonio, 4,187,155, Cl. 204-67.000.
Spector, George: *See—*
Machado, Manuel; and Spector, George, 4,186,546, Cl. 56-202.000.
Spellman, Gordon B., to Eaton Corporation. Solid state current limiter. 4,187,513, Cl. 357-1.000.
Spencer, Donald L., to University of Iowa Research Foundation, The. Apparatus and method for collecting solar energy. 4,186,726, Cl. 126-444.000.
Spengler, Adolf: *See—*
Eirich, Hubert; Eirich, Walter; Eirich, Paul; Hasenhundl, Josef; and Spengler, Adolf, 4,186,592, Cl. 73-73.000.

Sperry Rand Corporation: *See*—
Crane, Patrick E.; Lazarchik, Robert E.; and Schaufelberger, Arthur H., deceased, 4,187,507, Cl. 343-754.000.
Todd, Robert R., 4,186,753, Cl. 130-27.00T.

Spivack, John D.; and Dexter, Martin, to Ciba-Geigy Corporation. Amides of 2,4,6-trialkyl-3-hydroxyphenylalkanoic acids. 4,187,246, Cl. 260-559.00R.

Sprague, Peter W., to E. R. Squibb & Sons, Inc. 7-Oxabicycloheptane compounds. 4,187,236, Cl. 260-346.220.

Squifflet, Edmond C., Sr., to Boeing Construction Equipment Company. System and apparatus for erecting a portable silo and elevator structure. 4,187,047, Cl. 414-332.000.

Stacey, Gilbert J.: *See*—
Brittain, David R.; Brown, Edward D.; Hepworth, Walter; and Stacey, Gilbert J., 4,187,310, Cl. 424-258.000.

Stager, Phyllis H. Disposable cosmetic glove. 4,186,445, Cl. 2-164.000.

Stahl, Kurt-Wilhelm. Column for high pressure liquid chromatography. 4,187,177, Cl. 210-198.00C.

Stahl-Urban Company: *See*—
Conner, William R., Jr., 4,186,674, Cl. 112-153.000.

Stahlecker, Fritz, to Stahlecker, Fritz; and Stahlecker, Hans. Bearing for the spinning rotor of an open-end spinning assembly. 4,186,548, Cl. 57-58.890.

Stahlecker, Hans: *See*—
Stahlecker, Fritz, 4,186,548, Cl. 57-58.890.

Stake Technology Ltd.: *See*—
Brown, Douglas B., 4,186,658, Cl. 100-148.000.

Stakhov, Alexei P.; Vishnyakov, Jury M.; Luzhetsky, Vladimir A.; Ovodenko, Alexandr V.; Solyanichenko, Nikolai A.; and Fomichev, Alexandr V., to Taganrogsky Radiotekhnichesky Institut, USSR, Taganrog; and Vinnitsky Politekhnichesky Institut, USSR, Vinnitsa. Method and device for reduction of Fibonacci p-codes to minimal form. 4,187,500, Cl. 340-347.0DD.

Stamm, Russell D.: *See*—
Welch, Robert F.; and Stamm, Russell D., 4,186,612, Cl. 74-10.800.

Standard Oil Company (Indiana): *See*—
Slama, Francis J., 4,187,261, Cl. 525-243.000.

Standard Sichtgerate GmbH: *See*—
Brandel, Kurt, 4,186,505, Cl. 40-360.000.

Stanek, Petr: *See*—
Dolezal, Ladislav; Weiss, Frantisek; Stanek, Petr; and Lorenc, Miroslav, 4,186,610, Cl. 73-805.000.

Stanley-Mabo: *See*—
Quenot, Michel C. A., 4,186,490, Cl. 33-139.000.

Stanonis, David J.; King, Walter D.; and Coll, Emory E., to United States of America, Agriculture. Method and apparatus for verifying declared contents of contents of certain solids. 4,186,608, Cl. 73-437.000.

Stark, Anselm, to Siemens Aktiengesellschaft. Telephone and data network for mobile subscribers. 4,187,398, Cl. 179-2.0EB.

Starkweather, John H.: *See*—
Landis, Delmer H., Jr.; Lozier, Paul W.; Lievestro, Louis; Auxier, Thomas A.; and Starkweather, John H., 4,187,054, Cl. 415-115.000.

State of Israel, Ministry of Agriculture, The: *See*—
Alper, Yekutiel; and Margolin, Amikam, 4,186,520, Cl. 47-1.00R.

Stauffer Chemical Company: *See*—
Goswami, Jagadish C.; and Yu, Arthur J., 4,187,159, Cl. 204-159.170.

Stauter, John C., to UOP Inc. Hydrometallurgical recovery of cobalt and nickel. 4,187,281, Cl. 423-150.000.

Steel, Robert R.: *See*—
Nickerson, James H. D.; and Steel, Robert R., 4,186,799, Cl. 165-176.000.

Stehle, Heinz, to Kraftwerk Union Aktiengesellschaft. Method and apparatus for isotope concentration. 4,187,157, Cl. 204-157.10R.

Steiger, Fred H., to Personal Products Company. Perfuming self-adhering napkins. 4,186,743, Cl. 128-284.000.

Steinberger, Rolf: *See*—
Sander, Bruno; Scherling, Kurt; Steinberger, Rolf; and Ropte, Eckhard, 4,187,143, Cl. 162-157.00R.

Steinhilber, Wilhelm A., to Orion Machinery and Engineering Corporation. Wire accumulator tower. 4,186,861, Cl. 226-118.000.

Steinke, Leo; and Weyl, Helmut, to Robert Bosch GmbH. Electrochemical exhaust gas oxygen sensor construction. 4,187,163, Cl. 204-195.00S.

Stella, Joseph A., to Polaroid Corporation. Slide valve displacing arrangement for multipurpose cassette. 4,187,009, Cl. 352-130.000.

Stephenson, Richard. Macrame loom. 4,186,951, Cl. 289-16.500.

Stepniak, Frank M.; and Kominiak, Andrew A., to Amerace Corporation. Electrical connector. 4,186,985, Cl. 339-111.000.

Sterling Drug Inc.: *See*—
Schmidt, Paul J.; and Hung, William M., 4,187,223, Cl. 260-343.30R.

Stern, Howard K.: *See*—
Di Matteo, Paul L.; Ross, Joseph A.; Stern, Howard K.; and Waszak, Lawrence, 4,187,011, Cl. 353-122.000.

Stetsko, Viktor N.: *See*—
Kornilov, Anatoly A.; Petrushkin, Viktor D.; Stetsko, Viktor N.; and Fridman, Viktor M., 4,187,181, Cl. 210-332.000.

Stevenson, James S.; and Rodriques, John J., to Terminator Products, Inc. Closed system quick coupling head assembly. 4,186,759, Cl. 137-240.000.

Stewart, George W., Jr., to Ford Motor Company. Controlled beam projector. 4,186,899, Cl. 244-3.130.

Stewart-Naumann Laboratories, Inc.: *See*—
Xanthopoulos, Piritheous, 4,187,057, Cl. 417-63.000.

Stinnett, Arvil L. Portable duck blind. 4,186,507, Cl. 43-1.000.

Stoian, Liviu, to Motorola, Inc. Low leakage integrator for carburetor control. 4,186,700, Cl. 123-119.0EE.

Stoller, Frederick L., to Phillips Petroleum Company. Apparatus useful in control of edge uniformity in nonwoven fabrics. 4,186,470, Cl. 28-112.000.

Stoltman, Donald D.: *See*—
Haka, Raymond J.; and Stoltman, Donald D., 4,186,703, Cl. 123-119.00A.

Stone, John T., to Atlantic Container Corporation. Tool table construction. 4,186,784, Cl. 144-253.00J.

Storz, Ralph H.: *See*—
Bjorklund, Gary C.; and Storz, Ralph H., 4,187,027, Cl. 356-400.000.

Stout, Virgil L.; and Anderson, John M., to General Electric Company. Electrodeless fluorescent lamp with reduced spurious electromagnetic radiation. 4,187,447, Cl. 315-85.000.

Stratis, Melvin A. Method of preforming a one-piece wall covering. 4,187,273, Cl. 264-322.000.

Stratton, John M. Inflatable seat unit. 4,186,734, Cl. 128-33.000.

Stricker, Alfred A.: *See*—
Ficker, Walter W.; Lonser, David E.; Rance, William G.; Stricker, Alfred A.; and von Kaenel, Walter, 4,186,918, Cl. 271-232.000.

Strobel, Wolfgang: *See*—
Bachschmid, Reiner; Gross, Gerlinde; and Strobel, Wolfgang, 4,186,704, Cl. 123-122.0AA.

Stroebel, Gary J.: *See*—
Knappe, LaVerne F.; Peterson, Roger H.; and Stroebel, Gary J., 4,187,452, Cl. 318-128.000.

Strupinsky, Vladimir A.: *See*—
Pavlikov, Rudolf Z.; Shorygina, Natalya V.; Strupinsky, Vladimir A.; Kruglikov, Anatoly A.; Farbshtein, Jury G.; and Klipinitser, Iosif L., 4,187,369, Cl. 528-137.000.

Sudo, Takeshi: *See*—
Shimizu, Yoshiyuki; and Sudo, Takeshi, 4,186,993, Cl. 350-91.000.

Sugawara, Hiroshi: *See*—
Kyo, Kayomon; Asai, Yasuhiko; Kato, Sadao; Ishikura, Tadashi; and Sugawara, Hiroshi, 4,187,358, Cl. 525-132.000.

Sugawara, Shungo: *See*—
Hatano, Yoshio; Nonogaki, Saburo; Horigome, Shinkichi; and Sugawara, Shungo, 4,187,205, Cl. 260-30.40A.

Sugaya, Takao: *See*—
Yamashita, Chikao; Sugaya, Takao; and Yoshida, Noriyuki, 4,186,675, Cl. 112-158.00D.

Sugioka, Shuji: *See*—
Machii, Tetsuo; and Sugioka, Shuji, 4,187,515, Cl. 357-39.000.

Sukornick, Bernard: *See*—
Lockyer, George D., Jr.; Burd, Dennis E.; Sweeney, Richard F.; Sukornick, Bernard; and Ulmer, Harry E., 4,187,386, Cl. 585-367.000.

Sulzer Brothers Limited: *See*—
Emhardt, Roland; and Wachter, Erich, 4,186,932, Cl. 277-207.00A.

Sumitomo Chemical Company: *See*—
Kondo, Masatsune; and Tanoue, Akira, 4,187,202, Cl. 260-4.00R.

Summit Packaging Systems, Inc.: *See*—
White, Barry F., 4,186,853, Cl. 222-182.000.

Sunbeam Corporation: *See*—
Ernster, Peter J.; Canamero, Ernest; and Cockroft, James B., 4,187,412, Cl. 219-441.000.

Sundstrom, John A., to White Consolidated Industries, Inc. Fabric softener dispenser for vertical agitator. 4,186,574, Cl. 68-17.00A.

Sundstrom, Nils E., to AB Westin & Backlund. Regulators. 4,186,649, Cl. 91-170.00R.

Suntech, Inc.: *See*—
Lagow, Richard J.; Shimp, Lawrence A.; and Clark, Leland C., Jr., 4,187,252, Cl. 260-653.000.

Sutliff, Wayne N.; and Downen, Jim L. Optional up-blow, down-blow jar tool. 4,186,807, Cl. 175-302.000.

Sutton, Robert A., to Caterpillar Tractor Co. Equalizer bar support assembly. 4,186,812, Cl. 180-9.500.

Suzuki, Masaaki; Suzuki, Osamu; and Akashi, Goro, to Fuji Photo Film Co., Ltd. Magnetic recording tape. 4,187,341, Cl. 428-213.000.

Suzuki, Osamu: *See*—
Suzuki, Masaaki; Suzuki, Osamu; and Akashi, Goro, 4,187,341, Cl. 428-213.000.

Suzuki, Suzuo; Hata, Yoshitaka; and Ohnishi, Akihiro, to Nissan Motor Company Limited. Feedback control of exhaust gas recirculation based on combustion condition. 4,186,701, Cl. 123-119.00A.

Svub, Veroslav; Burian, Milan; Uruba, Vladimir; and Figalla, Zdenek, to GALA, narodni podnik. Process for making a game ball. 4,187,134, Cl. 156-170.000.

Swain, Richard S.; and Moore, Douglas R., to Norlin Industries, Inc. Tone generating system for electronic musical instrument. 4,186,637, Cl. 84-1.010.

Swann, Brian P.: *See*—
Evans, Delme; Jolley, Michael R. J.; Ross, William J.; and Swann, Brian P., 4,187,232, Cl. 549-69.000.

Swanson, Raymond. Easy opening trash bin lid. 4,186,844, Cl. 220-333.000.

Sweeney, Richard F.: *See*—
Lockyer, George D., Jr.; Burd, Dennis E.; Sweeney, Richard F.; Sukornick, Bernard; and Ulmer, Harry E., 4,187,386, Cl. 585-367.000.

Swift, Harold E.: *See—*
Madgavkar, Ajay M.; Vogel, Roger F.; and Swift, Harold E., 4,186,801, Cl. 166-256.000.
Syntex (U.S.A.) Inc.: *See—*
Edwards, John A., 4,187,301, Cl. 424-241.000.
Szczepanski, Harry. Atomizing liquid dispenser. 4,186,882, Cl. 239-327.000.
Szentivanyi, Matyas: *See—*
Takacs, Kalman; Literati, Peter N.; Kiss nee Ajzert, Ilona; Simay, Antal; Szentivanyi, Matyas; Virag, Sandor; and Farago, Katalin, 4,187,220, Cl. 260-239.00B.
Szor, Peter: *See—*
Bartha, Zoltan; Szor, Peter; and Haraszti, Jozsef, 4,186,949, Cl. 285-226.000.
Tabata, Yasuhiro: *See—*
Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; Tabata, Yasuhiro; and Kaneko, Tamaki, 4,187,024, Cl. 355-14.00R.
Tabel, Rene. System for the pyrolytic combustion of ligneous and other wastes. 4,186,668, Cl. 110-213.000.
Tadanier, John S.; and Martin, Jerry R., to Abbott Laboratories. 2-N-acyl and alkyl 6-epi-fortimicin B and derivatives. 4,187,296, Cl. 424-180.000.
Tadanier, John S.: *See—*
Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, 4,187,297, Cl. 424-180.000.
Martin, Jerry R.; Tadanier, John S.; and Collum, Paulette, 4,187,298, Cl. 424-180.000.
Taft, Keith G.: *See—*
Legat, Wilhelm H.; Taft, Keith G.; and Tiefert, Karl H., 4,187,516, Cl. 357-60.000.
Taganrogsky Radiotekhnichesky Institut, USSR, Taganrog: *See—*
Stakhov, Alexei P.; Vishnyakov, Jury M.; Luzhetsky, Vladimir A.; Ovodenko, Alexandr V.; Solyanichenko, Nikolai A.; and Fomichev, Alexandr V., 4,187,500, Cl. 340-347.0DD.
Taig, Alistair G., to Bendix Westinghouse Limited. Hydraulic power-assisted actuating arrangements. 4,186,651, Cl. 91-375.00R.
Taig, Alistair G., to Bendix Corporation, The. Hydraulic control device. 4,186,774, Cl. 137-625.230.
Takacs, Kalman; Literati, Peter N.; Kiss nee Ajzert, Ilona; Simay, Antal; Szentivanyi, Matyas; Virag, Sandor; and Farago, Katalin, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R.T. New O-(3-amino-2-hydroxy-propyl)-amidoxime derivatives, process for the preparation thereof and pharmaceutical compositions containing same. 4,187,220, Cl. 260-239.00B.
Takahashi, Hideaki; and Takeuchi, Takashi, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Oxygen concentration detecting element and method of producing the same. 4,187,486, Cl. 338-34.000.
Takahashi, Hideki: *See—*
Shimizu, Hirozumi; Igarashi, Taizo; Ishizaki, Takaharu; Koma, Toshio; and Takahashi, Hideki, 4,187,078, Cl. 44-51.000.
Takamura, Masayuki; Shinoda, Norio; Kurahashi, Kazuo; and Hatae, Masataka, to Nippon Gakki Seizo Kabushiki Kaisha. Billet and process for producing a tubular body by forced plastic deformation. 4,186,586, Cl. 72-264.000.
Takara Co., Ltd.: *See—*
Ogawa, Iwakichi, 4,186,515, Cl. 46-22.000.
Takasaki, Yoshitaka: *See—*
Ishizuka, Kohei; Takasaki, Yoshitaka; Kita, Yasuhiro; Nagoya, Yoshinori; and Kusama, Takeo, 4,187,479, Cl. 333-28.00R.
Takase, Sadao; and Asano, Masaharu, to Nissan Motor Company, Limited. Delayed response disabling circuit for closed loop controlled internal combustion engines. 4,186,691, Cl. 123-32.0EL.
Takayama, Satoru: *See—*
Yamaguchi, Nobutaka; Fujiyama, Masaaki; and Takayama, Satoru, 4,187,345, Cl. 428-337.000.
Takeda Chemical Industries, Ltd.: *See—*
Higashide, Eiji; Asai, Mitsuko; and Hasegawa, Toru, 4,187,292, Cl. 424-122.000.
Oyagi, Kenzi, 4,186,542, Cl. 53-88.000.
Takemoto, Nagaaki; Sakurai, Teruo; Mashiko, Kimio; and Tomari, Harumatsu, to Japan Tobacco & Salt Public Corporation, The. Method of processing smoking composition. 4,186,756, Cl. 131-140.00C.
Takeuchi, Takashi: *See—*
Takahashi, Hideaki; and Takeuchi, Takashi, 4,187,486, Cl. 338-34.000.
Takimoto, Sadaharu: *See—*
Monden, Souhei; and Takimoto, Sadaharu, 4,186,567, Cl. 63-14.00R.
Tamietto, Teresio: *See—*
Franzone, Jose S.; and Tamietto, Teresio, 4,187,308, Cl. 424-253.000.
Tamura, Junji: *See—*
Ishimaru, Yasuo; Kobayashi, Hiroshi; and Tamura, Junji, 4,186,864, Cl. 228-226.000.
Tamura, Kohji: *See—*
Noguchi, Takaharu; Ketori, Takao; Tamura, Kohji; Oi, Tetsu; and Miyoshi, Yutaka, 4,186,481, Cl. 29-603.000.
Tan, Aujit: *See—*
Fencl, Vernon R.; and Tan, Aujit, 4,187,406, Cl. 219-59.100.
Tanaka, Akio, to Zenith Radio Corporation. Limited channel television receiver with organized memory. 4,187,469, Cl. 325-464.000.
Tanaka, Kunihiko; Kurita, Masaru; and Nishiwaki, Osamu, to Fujisawa Pharmaceutical Co., Ltd. 7-(β-Aminoacylamino)-3-substituted-3-cephem-4-carboxylic acid derivatives and preparation thereof. 4,187,374, Cl. 544-28.000.
Tanaka, Minoru, to Hanazono Kogu Kabushiki Kaisha. Cutting hand tool. 4,186,484, Cl. 30-92.000.
Tanaka, Mitsugu: *See—*
Yagihara, Morio; Tanaka, Mitsugu; Hirose, Takeshi; and Aono, Toshiaki, 4,187,110, Cl. 430-544.000.
Tanaka, Ryuzo: *See—*
Ishigaki, Hisao; Tanaka, Ryuzo; and Nakamima, Koichi, 4,186,552, Cl. 58-88.00W.
Tanji, Akinori: *See—*
Akiyama, Takashi; Tanji, Akinori; and Asano, Seiichi, 4,187,343, Cl. 428-288.000.
Tanoue, Akira: *See—*
Kondo, Masatsune; and Tanoue, Akira, 4,187,202, Cl. 260-4.00R.
Tao, Lung-jo: *See—*
Ahn, Kie Y.; Cohen, Mitchell S.; Powers, John V.; and Tao, Lung-jo, 4,187,553, Cl. 365-8.000.
Tarcza, Walter H.: *See—*
Lu, Kun-Er; and Tarcza, Walter H., 4,187,094, Cl. 65-30.00R.
Tarumi, Noriyoshi; Ueno, Kenji; and Sakaguchi, Hirofumi, to Konishiroku Photo Industry Co., Ltd. Apparatus for measuring temperature. 4,186,606, Cl. 73-351.000.
Tate, Masahisa: *See—*
Yamada, Takeo; Ando, Seigo; Miyashita, Yoshio; Murakami, Katsuhiko; Tate, Masahisa; and Mizui, Kiyoshi, 4,186,792, Cl. 164-150.000.
Tatematsu, Shunji. Foldable hanger. 4,186,858, Cl. 223-94.000.
Taurus Gumiipari Vallalat: *See—*
Bartha, Zoltan; Szor, Peter; and Haraszti, Jozsef, 4,186,949, Cl. 285-226.000.
Taylor, Reginald S., to Taylor Woodrow Construction Limited. Equipment for extracting oil or gas from under the sea bed and method of installing such equipment. 4,187,038, Cl. 405-204.000.
Taylor Woodrow Construction Limited: *See—*
Taylor, Reginald S., 4,187,038, Cl. 405-204.000.
Telecommunications Radioelectriques et Telephoniques TRT: *See—*
Ferrieu, Gilbert M. M., 4,187,400, Cl. 179-15.0AA.
Telkes, Maria, to American Technological University. Phase change thermal storage materials with crust forming stabilizers. 4,187,189, Cl. 252-70.000.
Tenmyo, Shigemoto: *See—*
Koide, Hiroshi; Watanabe, Junichi; and Tenmyo, Shigemoto, 4,186,991, Cl. 350-6.910.
Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M. Automatic line for coated metal mould casting. 4,186,793, Cl. 164-158.000.
Terminator Products, Inc.: *See—*
Stevenson, James S.; and Rodriques, John J., 4,186,759, Cl. 137-240.000.
Tesa, S.A.: *See—*
Gattesco, Giovanni, 4,186,492, Cl. 33-147.00T.
Teske, Lothar. Gate for storage-tank outlet. 4,186,854, Cl. 222-185.000.
Testut Aequitas: *See—*
Dauge, Gilbert V.; and Langlais, Jacques F., 4,187,460, Cl. 324-60.0CD.
Texaco Development Corporation: *See—*
Park, Jack H.; and Hunter, Walter D., 4,187,185, Cl. 252-8.55D.
Waddill, Harold G., 4,187,367, Cl. 528-94.000.
Texaco Inc.: *See—*
Allen, Joseph C., 4,186,800, Cl. 166-256.000.
Brown, Winthrop, 4,186,597, Cl. 73-136.00A.
Schievelbein, Vernon H., 4,187,073, Cl. 252-8.55D.
Texas Brine Corporation: *See—*
Mondshine, Thomas C., 4,186,803, Cl. 166-292.000.
Texas Instruments Incorporated: *See—*
Cochran, Michael J., 4,187,473, Cl. 331-8.000.
Patterson, John D., 4,187,493, Cl. 367-135.000.
Textron, Inc.: *See—*
Lawrence, Charles T., 4,186,467, Cl. 24-205.16R.
Thebaud, Sacha. Foldable chair. 4,186,959, Cl. 297-16.000.
Theiling, Louis F., Jr.: *See—*
Cowherd, Frank G., III; and Theiling, Louis F., Jr., 4,187,382, Cl. 560-185.000.
Cowherd, Frank G., III; and Theiling, Louis F., Jr., 4,187,383, Cl. 560-224.000.
Theurer, Josef; and Fulser, Karl, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Ballast excavating chain arrangement. 4,186,804, Cl. 171-16.000.
Thien, Gerhard; and Fachbach, Heinz, to List, Hans. Water-cooled internal combustion engine for motor vehicles, particularly a diesel engine. 4,186,693, Cl. 123-41.120.
Thiery, Joachim: *See—*
Haker, Rolf; Schrader, Klaus; and Thiery, Joachim, 4,187,462, Cl. 324-204.000.
Thomas C. Wilson, Inc.: *See—*
Schott, Donald E., 4,186,584, Cl. 72-122.000.
Thomas International Corporation: *See—*
Roberts, Patrick S., 4,186,636, Cl. 84-1.010.
Thomas, Richard N.: *See—*
Morley, Colin A.; Thomas, Richard N.; and Kollar, Bela, 4,187,505, Cl. 340-753.000.
Thompson, Carroll R., to NDT Systems, Inc. Pipe inspection systems. 4,187,425, Cl. 250-358.00P.

Thomson-CSF: *See*—
Deman, Pierre; and d'Auria, Luigi, 4,187,404, Cl. 179-100.00R.
Roziere, Guy, 4,187,002, Cl. 350-314.000.
Thomson, Eugene F., to Whirlpool Corporation. Tilt down receptacle for refrigerator door. 4,186,978, Cl. 312-138.00A.
Thornton, John N.: *See*—
Thwaites, Peter J.; and Thornton, John N., 4,187,138, Cl. 156-512.000.
Thwaites, Peter J.; and Thornton, John N., to Dufaylite Developments Ltd. Slicing web material. 4,187,138, Cl. 156-512.000.
Tichenor, Clyde L.; and LeVasseur, Craig, to Berkey-Colortran, Inc. Universal lens mounting for selective spotlight beam spread. 4,187,534, Cl. 362-268.000.
Tiefert, Karl H.: *See*—
Legat, Wilhelm H.; Taft, Keith G.; and Tiefert, Karl H., 4,187,516, Cl. 357-60.000.
Tinker, Inc.: *See*—
Hunt, C. D., Jr., 4,186,928, Cl. 273-244.000.
Toda, Yoshihiko: *See*—
Nagura, Yukihiro; and Toda, Yoshihiko, 4,187,525, Cl. 361-42.000.
Todd, Robert R., to Sperry Rand Corporation. Material flow retarders. 4,186,753, Cl. 130-27.00T.
Tokico Ltd.: *See*—
Ito, Yoshimasa; and Ikeda, Junichi, 4,187,454, Cl. 318-568.000.
Tokyo Juki Kogyo Kabushiki Kaisha: *See*—
Kondo, Shigeki, 4,186,469, Cl. 26-19.000.
Tokyo Kogaku Kikai Kabushiki Kaisha: *See*—
Kato, Yasuo; and Nunokawa, Kazuo, 4,187,014, Cl. 354-62.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Nagura, Yukihiro; and Toda, Yoshihiko, 4,187,525, Cl. 361-42.000.
Tokyo Shibaura Electric Co., Ltd.: *See*—
Endoh, Kenjiro; Ohkawa, Motokazu; Kitagawa, Kazuo; and Kira, Hideshi, 4,187,477, Cl. 333-14.000.
Endoh, Kenjiro; Ohkawa, Motokazu; Kitagawa, Kazuo; and Kira, Hideshi, 4,187,478, Cl. 333-14.000.
Iinuma, Kazuhiro, 4,186,747, Cl. 128-660.000.
Machii, Tetsuo; and Sugioka, Shuji, 4,187,515, Cl. 357-39.000.
Tomisawa, Yutaka; and Mitani, Tatsuro, 4,187,514, Cl. 357-22.000.
Tolbert, William R.; and Feder, Joseph, to Monsanto Company. Cell culture sampling system. 4,187,149, Cl. 195-104.000.
Toledo-Pereyra, Luis H., to Henry Ford Hospital. Perfusion system for organ preservation. 4,186,565, Cl. 62-306.000.
Tomari, Harumatsu: *See*—
Takemoto, Nagaaki; Sakurai, Teruo; Mashiko, Kimio; and Tomari, Harumatsu, 4,186,756, Cl. 131-140.00C.
Tomashek, James R.: *See*—
Heffernan, James P.; Sheldon, Loren B.; Tomashek, James R.; and Ward, Donald H., 4,187,546, Cl. 364-565.000.
Tomikawa, Ryoichi: *See*—
Yamamoto, Yasunobu; Tomikawa, Ryoichi; Sakabe, Toshiaki; and Matsumoto, Yasuhiro, 4,187,133, Cl. 156-166.000.
Tomisawa, Yutaka; and Mitani, Tatsuro, to Tokyo Shibaura Electric Co., Ltd. Junction type field effect transistor. 4,187,514, Cl. 357-22.000.
Tomita, Chuji; and Abe, Hiroshi, to Hitachi Medical Corporation. Scanning apparatus for cross-sectional inspection equipment. 4,187,429, Cl. 250-445.00T.
Tomlinson, Walter J., III: *See*—
Chandross, Edwin A.; and Tomlinson, Walter J., III, 4,187,111, Cl. 430-2.000.
Toppan Printing Co., Ltd.: *See*—
Homma, Kokichi, deceased; and Kameyama, Yoshio, 4,187,107, Cl. 430-252.000.
Tower, Stephen N.: *See*—
Braun, Howard E.; Dollard, Walter J.; and Tower, Stephen N., 4,187,147, Cl. 176-38.000.
Towgood, Dennis A.: *See*—
Friedericy, Johan A.; Moeller, Dale O.; and Towgood, Dennis A., 4,186,623, Cl. 74-572.000.
Townsend, John M.; and Valentine, Donald H., Jr., to Hoffman-La Roche Inc. Metal phosphine complex. 4,187,241, Cl. 260-438.100.
Toyobo Co., Ltd.: *See*—
Akiyama, Takashi; Tanji, Akinori; and Asano, Seiichi, 4,187,343, Cl. 428-288.000.
Etoh, Kuniomi; Nanpei, Masaru; and Miyagi, Morio, 4,187,112, Cl. 430-285.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
Arai, Hajime; and Oonuma, Kiyoshi, 4,186,557, Cl. 60-361.000.
Kuramochi, Koujiro, 4,186,627, Cl. 74-869.000.
Yasuda, Yushiro; and Bessho, Hironori, 4,186,697, Cl. 123-117.00A.
Tozen Sangyo Co., Ltd.: *See*—
Muroi, Sankichi, 4,186,775, Cl. 138-30.000.
Tracy, Gene A.: *See*—
Fessler, Herman S.; and Tracy, Gene A., 4,187,262, Cl. 261-50.00B.
Traubel, Harro; Dieterich, Dieter; and Heinze, Helga, to Bayer Aktiengesellschaft. Water-soluble cationic oligourethane resins and the use thereof for the treatment of pelts or leather. 4,187,074, Cl. 8-94.190.
Traut, Earl W. Bypass rotary gas expansion motor. 4,187,062, Cl. 418-61.00B.
Troncy, Robert: *See*—
Cerny, Jacqueline; and Troncy, Robert, 4,187,207, Cl. 260-37.00N.
TRW Inc.: *See*—
Zukowski, Leonard J., 4,187,033, Cl. 403-137.000.
Tsaizer, Gerbert G.: *See*—
Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M., 4,186,793, Cl. 164-158.000.
Tseluiko, Jury I.; Kutsykovich, Dorina B.; Shabelnikova, Ljudmila A.; Kholopov, Vladimir P.; Schekin, Nikolai G.; Gritsuk, Lev D.; and Katsenelenbogen, Leonid B. Tubular cooled members of metallurgical furnace. 4,186,798, Cl. 165-147.000.
Tsunekawa, Tokuichi: *See*—
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,187,019, Cl. 354-33.000.
Tucker, Archie J.: *See*—
Covington, Roger G.; Miller, Stephen H.; and Tucker, Archie J., 4,187,077, Cl. 422-63.000.
Tulipan, Peter A.: *See*—
Hilson, David G.; and Tulipan, Peter A., 4,187,201, Cl. 252-512.000.
Tunze, Norbert. Centrifugal pump. 4,187,053, Cl. 415-111.000.
Turbeville, Joseph E. Method and apparatus for pollutant spill control. 4,187,187, Cl. 252-62.540.
Turner, Carlton E.: *See*—
Elsohly, Mahmoud A.; and Turner, Carlton E., 4,187,076, Cl. 23-230.0PC.
Tutihasi, Simpei, to Xerox Corporation. Electrophotographic photoreceptor with composite interlayer and method of making. 4,187,104, Cl. 430-57.000.
Twin Disc, Incorporated: *See*—
Schneider, Raymond C.; and Pelligrino, Paul A., 4,186,829, Cl. 192-109.00F.
Tyree, Lewis, Jr. Cryogenic refrigeration for vehicles. 4,186,562, Cl. 62-62.000.
Tyree, Lewis, Jr. Steam cooking with direct contact CO_2 cooling. 4,187,325, Cl. 426-510.000.
Tyrol Shoe Co. Ltd.: *See*—
Salzman, Otto, 4,186,500, Cl. 36-117.000.
Tzakis, George J.: *See*—
Avicola, Richard; and Tzakis, George J., 4,187,537, Cl. 363-127.000.
Uchidoi, Masanori: *See*—
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,187,019, Cl. 354-33.000.
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, to Canon Kabushiki Kaisha. Flash light photographic systems. 4,187,019, Cl. 354-33.000.
Uchiyama, Yasuji: *See*—
Hiyoshi, Teruo; Nakada, Akira; Uchiyama, Yasuji; Yamaga, Eiichi; and Aoki, Eiichiro, 4,186,640, Cl. 84-1.030.
Ueda, Kiyoharu: *See*—
Shibuya, Teiji; Ishikawa, Yasuaki; Saito, Masayuki; and Ueda, Kiyoharu, 4,187,085, Cl. 55-4.000.
Ueno, Kenji: *See*—
Tarumi, Noriyoshi; Ueno, Kenji; and Sakaguchi, Hirofumi, 4,186,606, Cl. 73-351.000.
Ueyama, Takehiko; Nishizawa, Masahiro; Yamazaki, Eiichi; and Ogura, Iwao, to Hitachi, Ltd. Method and apparatus for exposure of phosphor screen. 4,187,012, Cl. 354-1.000.
Ukrainsky Nauchno: *See*—
Sladkoshteev, Vladimir T.; Shatagin, Oleg A.; Khalemsky, Samuil F.; and Besedina, Eleonora B., 4,186,791, Cl. 164-66.000.
Ullman, Frederick E.: *See*—
Corey, Robert L.; and Ullman, Frederick E., 4,186,830, Cl. 193-35.00R.
Ulmer, Harry E.: *See*—
Lockyer, George D., Jr.; Burd, Dennis E.; Sweeney, Richard F.; Sukornick, Bernard; and Ulmer, Harry E., 4,187,386, Cl. 585-367.000.
Ulmer, Jamie F. Electromagnetic engine. 4,187,440, Cl. 310-24.000.
Unarco Industries, Inc.: *See*—
Corey, Robert L.; and Ullman, Frederick E., 4,186,830, Cl. 193-35.00R.
Underwood, Ronald. Adjustable bed support pedestal. 4,186,452, Cl. 5-58.000.
Unicorn Industries: *See*—
Kosup, Russell R., 4,187,482, Cl. 335-12.000.
Union Carbide Corporation: *See*—
Choulet, Richard J.; and Mehlman, Stewart K., 4,187,102, Cl. 75-60.000.
Cowherd, Frank G., III; and Theiling, Louis F., Jr., 4,187,382, Cl. 560-185.000.
Cowherd, Frank G., III; and Theiling, Louis F., Jr., 4,187,383, Cl. 560-224.000.
Heile, Robert F., 4,187,408, Cl. 219-121.0LM.
Kirkpatrick, George F., 4,186,786, Cl. 150-3.000.
Union Oil Company of California: *See*—
Whitescarver, Olin D., 4,187,087, Cl. 55-43.000.
Union Siderurgique de Nord et du l'est de la France: *See*—
Costes, Claude, 4,186,629, Cl. 81-53.00R.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the: *See*—
Bryce, Graham W.; and Hunter, Joseph J., 4,187,411, Cl. 219-137.200.
United McGill Corporation: *See*—
Harmon, William M.; Holtzmeier, Lindell R.; and Yamamoto, Toshiaki, 4,186,539, Cl. 52-580.000.

U.S. Industries, Inc.: *See*—
Snyder, David E., 4,186,766, Cl. 137-458.000.
United States of America
Agriculture: *See*—
Stanonis, David J.; King, Walter D.; and Coll, Emory E., 4,186,608, Cl. 73-437.000.
Army: *See*—
Gladden, James W., 4,187,106, Cl. 430-1.000.
Kinnamon, Kenneth E., 4,187,300, Cl. 424-198.000.
Milberger, Walter E.; and Wright, Larry G., 4,187,458, Cl. 323-17.000.
Olesch, Reinhard G.; and Rittenbach, Otto E., 4,187,501, Cl. 340-554.000.
Powers, Edmund M., 4,187,351, Cl. 435-38.000.
Boston: *See*—
Buckley, Albert P.; and Dill, Melville R., Jr., 4,186,841, Cl. 220-6.000.
Energy: *See*—
Weil, Bradley S.; and Metz, Curtis F., III, 4,186,657, Cl. 100-39.000.
National Aeronautics and Space Administration; administrator; with respect to an invention of:
Clauss, Robert C.; and Quinn, Rex B. Dielectric-loaded waveguide circulator for cryogenically cooled and cascaded maser waveguide structures. 4,187,470, Cl. 330-4.000.
Dickinson, Richard M. Microwave power transmission beam safety system. 4,187,506, Cl. 343-100.00R.
National Aeronautics and Space Administration: *See*—
Caro, Edward R., 4,187,416, Cl. 200-153.00S.
Fryer, Thomas B., 4,186,749, Cl. 128-748.000.
Sievers, Michael W., 4,187,394, Cl. 178-58.00R.
Navy: *See*—
Anderson, William B.; and Markwald, David B., 4,187,488, Cl. 367-13.000.
Bond, James W.; and Dressel, Gary A., 4,187,549, Cl. 364-746.000.
Fabula, Andrew G.; Green, James H.; and Madison, William F., 4,186,679, Cl. 114-20.00R.
Gish, Oliver H., 4,186,681, Cl. 114-240.00R.
Goldberg, Leonard J., 4,187,290, Cl. 424-93.000.
Jones, Charles H., 4,187,556, Cl. 367-155.000.
Kuester, Donald W., 4,186,768, Cl. 137-516.250.
Lindstrum, Alan L.; and Chase, Jay V., 4,187,491, Cl. 367-125.000.
U.S. Philips Corporation: *See*—
Binder Kriegelstein, Wolfgang; and Berger, Erich, 4,186,480, Cl. 29-603.000.
Boekhorst, Antonius, 4,187,451, Cl. 315-381.000.
Brice, John C.; Hill, Owen F.; and Pratt, Ronald G., 4,187,139, Cl. 156-600.000.
Govaert, George A.; Nijholt, Meinardus A. G.; and Rodenburg, Lammert, 4,187,536, Cl. 363-21.000.
van Lotringen, Antonius L. M., 4,186,728, Cl. 128-1.00R.
United Technologies Corporation: *See*—
Bizzarro, Peter; and Warner, John L., 4,187,090, Cl. 55-269.000.
Cooper, Dean E., 4,186,622, Cl. 74-501.00R.
Healey, David M.; and Games, John E., 4,187,543, Cl. 364-505.000.
Martin, Anthony N., 4,187,455, Cl. 318-594.000.
Unitika Ltd.: *See*—
Kyo, Kayomon; Asai, Yasuhiko; Kato, Sadao; Ishikura, Tadashi; and Sugawara, Hiroshi, 4,187,358, Cl. 525-132.000.
Universal Security Instruments, Inc.: *See*—
Fish, Darrell D., 4,187,058, Cl. 417-234.000.
Kovens, Michael L.; and Hoge, Henry H., 4,187,496, Cl. 340-63.000.
University of Iowa Research Foundation, The: *See*—
Spencer, Donald L., 4,186,726, Cl. 126-444.000.
University of Mississippi, The: *See*—
Elsohly, Mahmoud A.; and Turner, Carlton E., 4,187,076, Cl. 23-230.0PC.
Uno, Shigeo: *See*—
Matsuda, Shimpei; Kato, Akira; Uno, Shigeo; and Nakajima, Fumito, 4,187,282, Cl. 423-244.000.
UOP Inc.: *See*—
Stauter, John C., 4,187,281, Cl. 423-150.000.
Upjohn Company, The: *See*—
Axen, Udo F., 4,187,224, Cl. 260-346.220.
Uruba, Vladimir: *See*—
Svub, Veroslav; Burian, Milan; Uruba, Vladimir; and Figalla, Zdenek, 4,187,134, Cl. 156-170.000.
USUI International Industry, Ltd.: *See*—
Usui, Masayoshi, 4,186,796, Cl. 165-105.000.
Usui, Masayoshi, to USUI International Industry, Ltd. Heat pipe element. 4,186,796, Cl. 165-105.000.
Vachhani, Vasantrai A.: *See*—
Reavis, Robert P., Jr.; Soderstrom, Melvin A.; and Vachhani, Vasantrai A., 4,186,984, Cl. 339-103.00R.
Valenta, James D.; and Heruth, Kenneth T., to Airco, Inc. Drug nebulizing system for medical ventilators of the volume-limited type. 4,186,737, Cl. 128-203.280.
Valentine, Donald H., Jr.: *See*—
Townsend, John M.; and Valentine, Donald H., Jr., 4,187,241, Cl. 260-438.100.
VanDewoestine, Robert V.: *See*—
Coppola, Frank T.; Lentz, William P.; and VanDewoestine, Robert V., 4,186,723, Cl. 126-443.000.
Van Lith, Martin J.: *See*—
Burns, John E.; and Van Lith, Martin J., 4,186,453, Cl. 5-82.00R.
van Lotringen, Antonius L. M., to U.S. Philips Corporation. Apparatus for adapting a skull for the application of a pressure transducer. 4,186,728, Cl. 128-1.00R.
Van Peski, Christopher: *See*—
Woods, Leslie A.; and Van Peski, Christopher, 4,186,939, Cl. 280-477.000.
Van Uitert, LeGrand G.: *See*—
Singh, Shobha; Van Uitert, LeGrand G.; and Zydzik, George J., 4,187,530, Cl. 361-433.000.
Van Veelen, George F.: *See*—
Kokelenberg, Hendrik E.; Sels, Francis J.; and Van Veelen, George F., 4,187,114, Cl. 430-510.000.
Varga, Paul, to Salisbury Special Tool. Precision workpiece positioning means for machine tools. 4,186,916, Cl. 269-303.000.
Varian Associates, Inc.: *See*—
Gerard, William A., 4,187,444, Cl. 315-39.710.
Varlamov, Gennady D.: *See*—
Bekbulatov, Ildgam A.; Mamatov, Juldash; Varlamov, Gennady D.; Madaliev, Shavkat; and Gaibov, Valery M., 4,187,368, Cl. 525-503.000.
Vartoukian, Artin G., to Singer Company, The. Material feed mechanism for sewing machines. 4,186,673, Cl. 112-121.150.
Vasilieva, Raisa V.: *See*—
Gorodissky, Leonid G.; Vasilieva, Raisa V.; Zhmurov, Vyacheslav I.; Kozlov, Mikhail D.; Kuzmina, Vera I.; and Romanov, Nikolai T., deceased, 4,186,571, Cl. 68-5.00E.
Vassar, Clyde W., to W. James Kemerer, a part interest. Variable profile extrusion apparatus. 4,187,068, Cl. 425-381.000.
Verco Manufacturing, Inc.: *See*—
Morton, Virgil R., 4,186,535, Cl. 52-250.000.
Verdier, Henri, to Compagnie Generale des Etablissements Michelin. Heavy-duty radial tire with ply of oblique elastic cords radially inward of the carcass. 4,186,789, Cl. 152-354.00R.
Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft: *See*—
Gebetsroither, Wolfgang; and Zitz, Alfred, 4,186,971, Cl. 299-64.000.
Vernco Corporation: *See*—
Barnstead, John W., 4,187,055, Cl. 416-132.00A.
Verstegen, Brian P., to Durango Systems, Inc. Read only memory character generator system. 4,187,552, Cl. 364-900.000.
Vesel, Andrew M., to Cessna Aircraft Company, The. Analog control of pulse rates. 4,187,439, Cl. 307-271.000.
Vicesuinci, Louise V.: *See*—
Vigilante, Adele; and Vicesuinci, Louise V., 4,186,489, Cl. 33-2.00H.
Videon, S.A.: *See*—
Nissen, Alex; and Charles, Distel, 4,186,619, Cl. 74-414.000.
Vieau, William J., to FMC Corporation. Flexographic inking system including a reverse angle doctor blade. 4,186,661, Cl. 101-178.000.
Vigilante, Adele; and Vicesuinci, Louise V. Measuring, pressing and hemming device. 4,186,489, Cl. 33-2.00H.
Villa, Enrico; and Radice, Angelo, to Rockwell-Rimoldi, S.p.A. Apparatus for forming a chain of stitches on double needle sewing machines. 4,186,676, Cl. 112-165.000.
Vincent, David N.; and Chang, Cheng-Hsiung, to Champion International Corporation. Micro-capsules containing ureido fluoran chromogenic compounds. 4,187,193, Cl. 252-316.000.
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Stakhov, Alexei P.; Vishnyakov, Jury M.; Luzhetsky, Vladimir A.; Ovodenko, Alexandr V.; Solyanichenko, Nikolai A.; and Fomichev, Alexandr V., 4,187,500, Cl. 340-347.0DD.
Virag, Sandor: *See*—
Takacs, Kalman; Literati, Peter N.; Kiss nee Ajzert, Ilona; Simay, Antal; Szentivanyi, Matyas; Virag, Sandor; and Farago, Katalin, 4,187,220, Cl. 260-239.00B.
Viscodynamics Corporation: *See*—
Braga, Luigi F., 4,186,852, Cl. 222-146.0HE.
Vishnyakov, Jury M.: *See*—
Stakhov, Alexei P.; Vishnyakov, Jury M.; Luzhetsky, Vladimir A.; Ovodenko, Alexandr V.; Solyanichenko, Nikolai A.; and Fomichev, Alexandr V., 4,187,500, Cl. 340-347.0DD.
Vitols, Visvaldis A.; and White, Stanley A., to Rockwell International Corporation. System for expanding the video contrast of an image. 4,187,519, Cl. 358-169.000.
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Keznickl, Eduard, 4,187,008, Cl. 352-108.000.
Vodrazka, Wolfgang: *See*—
Platz, Rolf; Fuchs, Werner; and Vodrazka, Wolfgang, 4,187,384, Cl. 568-618.000.
Voelkers, James D.: *See*—
Ball, Donald H.; and Voelkers, James D., 4,187,542, Cl. 364-502.000.
Vogel, Roger F.: *See*—
Madgavkar, Ajay M.; Vogel, Roger F.; and Swift, Harold E., 4,186,801, Cl. 166-256.000.
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Burghardt, Wilfried; Vogel, Rolf; and Zauser, Ludwig, 4,186,895, Cl. 242-107.40B.
Vogelsang, Charles J.: *See*—
Nielsen, Richard B.; and Vogelsang, Charles J., 4,187,174, Cl. 210-32.000.

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Danckert, Hermann; Willmann, Michael; and Wundrak, Egon, 4,186,714, Cl. 123-195.00C.
Voltz, Sterling E.: *See*—
Gross, Benjamin; Jacob, Solomon M.; Nace, Donald M.; and Voltz, Sterling E., 4,187,548, Cl. 364-578.000.
von der Heide, Johann, to Papst-Motoren KG. Incremental positioning system. 4,187,456, Cl. 318-616.000.
von Kaenel, Walter: *See*—
Ficker, Walter W.; Lonser, David E.; Rance, William G.; Stricker, Alfred A.; and von Kaenel, Walter, 4,186,918, Cl. 271-232.000.
Voser, Othmar, to Kupferdraht-Isolierwerk Ag Wildegg. High frequency coaxial cable and method of producing same. 4,187,391, Cl. 174-106.00R.
Voss, Hans W.: *See*—
Reinmoller, Adolf; Voss, Hans W.; and Kluting, Bernd, 4,186,904, Cl. 248-395.000.
Vsesojuzny Nauchno-Issledovatelsky I Experimentalny Institut Po Pererabotke Khimicheskikh Volokon: *See*—
Gorodissky, Leonid G.; Vasilieva, Raisa V.; Zhmurov, Vyacheslav I.; Kozlov, Mikhail D.; Kuzmina, Vera I.; and Romanov, Nikolai T., deceased, 4,186,571, Cl. 68-5.00E.
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Eroshkin, Nikolai A.; Ivannikov, Alfred V.; Matveev, Vyacheslav N.; and Sergienko, Anatoly I., 4,187,410, Cl. 219-137.200.
Vuillemot, Daniel: *See*—
Euzen, Jean-Paul; Vuillemot, Daniel; and Dujardin, Claude, 4,187,169, Cl. 208-157.000.
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Reijonen, Veli E., 4,187,148, Cl. 48-197.00R.
Vyzkumny ustav tvarecich stroju a technologie tvareni: *See*—
Kovar, Jan; Drkal, Jan; Zalesak, Jan; and Hladky, Vaclav, 4,186,583, Cl. 72-108.000.
Zalesak, Jan; and Kovar, Jan, 4,186,580, Cl. 72-14.000.
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Dolezal, Ladislav; Weiss, Frantisek; Stanek, Petr; and Lorenc, Miroslav, 4,186,610, Cl. 73-805.000.
W. James Kemerer: *See*—
Vassar, Clyde W., 4,187,068, Cl. 425-381.000.
W. L. Gore & Associates, Inc.: *See*—
Gore, Robert W., 4,187,390, Cl. 174-102.00R.
Wachter, Erich: *See*—
Emhardt, Roland; and Wachter, Erich, 4,186,932, Cl. 277-207.00A.
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Waddill, Harold G., to Texaco Development Corporation. Epoxy resins with improved adhesion and peel strength. 4,187,367, Cl. 528-94.000.
Wagenknecht, John H.: *See*—
Coleman, James P.; and Wagenknecht, John H., 4,187,156, Cl. 204-73.00R.
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Wagner, Kuno, to Bayer Aktiengesellschaft. Condensation of formaldehyde hydrate to form mixtures which, together with monomers capable of aminoplast formation are useful in the preparation of polyurethane foams. 4,187,356, Cl. 521-158.000.
Wagner, William T., to Dayco Corporation. Corrugated metal tube. 4,186,779, Cl. 138-121.000.
Waiamea Company, Inc.: *See*—
Donan, David C., Jr., 4,187,040, Cl. 405-259.000.
Wainer, Eugene; and Lewis, James M., to Horizons Research Incorporated. Photosensitive image forming composition containing at least one substituted bis-diaryl vinylidene compound and/or at least one substituted bis-diaryl imine compound. 4,187,105, Cl. 430-336.000.
Walden, Frank B. Mailbox attachment. 4,186,870, Cl. 232-35.000.
Walden, Jack M.: *See*—
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,187,547, Cl. 364-710.000.
Wallace, John M.; and Pitner, Gerald A., to Frank Hamachek Machine Company. Article orientation determining apparatus. 4,187,545, Cl. 364-559.000.
Wallshein, Melvin. Orthodontic arch wire. 4,186,487, Cl. 433-20.000.
Wallshein, Melvin. Orthodontic bracket with multi-layer base. 4,186,488, Cl. 433-8.000.
Walmet, Gunnar E.; and Matson, Stephen L., to General Electric Company. Packaged membrane system and replenishment method. 4,187,086, Cl. 55-16.000.
Walter, John, to Continental Group, Inc., The. Base type dispenser for bottle-like container with collapsible dispensing and vent lines. 4,186,848, Cl. 222-23.000.
Walter, Karl, to Labortechnik M. R. Walter. Apparatus for transporting webs of photosensitive material. 4,187,022, Cl. 354-318.000.
Walton, Robert G. Sump alarm device. 4,187,503, Cl. 340-624.000.
Wang, Richard H. S.: *See*—
Irick, Gether, Jr.; Ownby, James C.; and Wang, Richard H. S., 4,187,213, Cl. 252-402.000.
Wanlass, Cravens L. Polyphase electric motor having controlled magnetic flux density. 4,187,457, Cl. 318-729.000.
Ward, Donald H.: *See*—
Heffernan, James P.; Sheldon, Loren B.; Tomashek, James R.; and Ward, Donald H., 4,187,546, Cl. 364-565.000.
Ward, Gerald G., to International Harvester Company. Plow system. 4,186,806, Cl. 172-283.000.
Warkentin, James D.: *See*—
Rasheed, Khalid; and Warkentin, James D., 4,187,096, Cl. 71-90.000.
Warne, Michael A., to Marston Excelsior Limited. Anode. 4,187,164, Cl. 204-196.000.
Warner, John L.: *See*—
Bizzarro, Peter; and Warner, John L., 4,187,090, Cl. 55-269.000.
Warner-Lambert Company: *See*—
Butler, Donald E., 4,187,311, Cl. 424-263.000.
Butler, Donald E., 4,187,379, Cl. 546-288.000.
Koch, Edwin R.; Abbazia, Leonard P.; and Puglia, Wayne J., 4,187,320, Cl. 426-3.000.
Warner & Swasey Company, The: *See*—
Shawke, Jerome R., 4,186,491, Cl. 33-143.00L.
Warren, John, to Lucas Industries Limited. Electrical switch. 4,187,419, Cl. 200-308.000.
Wassmer, Norman B.; and Hodges, Joseph L., to Ore-Ida Foods, Inc. Differential reflectivity method and apparatus for sorting indiscriminately mixed items. 4,186,836, Cl. 209-565.000.
Waszak, Lawrence: *See*—
Di Matteo, Paul L.; Ross, Joseph A.; Stern, Howard K.; and Waszak, Lawrence, 4,187,011, Cl. 353-122.000.
Watanabe, Junichi: *See*—
Koide, Hiroshi; Watanabe, Junichi; and Tenmyo, Shigemoto, 4,186,991, Cl. 350-6.910.
Watanabe, Sakuji, to Nippon Kogaku K.K. Motor drive device in a camera. 4,187,017, Cl. 354-173.000.
Watanabe, Yoshiharu: *See*—
Nakagawa, Koji; and Watanabe, Yoshiharu, 4,187,118, Cl. 106-89.000.
Watanabe, Youichi, to Kabushiki Kaisha Meidensha. Drive simulator operating method. 4,186,593, Cl. 73-117.000.
Watson, Robert E.: *See*—
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,187,547, Cl. 364-710.000.
Wausau Metals Corporation: *See*—
Weber, Ronald J., 4,186,656, Cl. 98-99.00R.
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; and Wollenhaupt, Karl-Heinz, to Carl Still, Firma. Method for producing form coke. 4,187,079, Cl. 44-10.00C.
Weber, Ida, to B.M.C.-Brevets-Marques-Chaussures S.A. Sole with high heel for woman footwear, consisting of a plastic material monoblock having a rigid and a flexible part. 4,186,498, Cl. 36-32.00R.
Weber, Roland: *See*—
Hafke, Carl; Weber, Roland; and Kohlen, Rudolf, 4,187,080, Cl. 48-202.000.
Weber, Ronald J., to Wausau Metals Corporation. Thermal break ventilator unit. 4,186,656, Cl. 98-99.00R.
Wedlake, Roger J.; and Penny, Anthony L. Hard materials of BCN in tetrahedral form and method of making it. 4,187,083, Cl. 51-307.000.
Wegmann, Jerome B., to McNeill Corporation. Lubricating apparatus. 4,186,821, Cl. 184-7.00D.
Wehrmann, Nicholas; and Williams, Charlie L., to Ithaca Textiles, Inc. Method of making hosiery. 4,186,471, Cl. 28-154.000.
Weidemann, Dieter: *See*—
Lutze, Hans; Weidemann, Dieter; and Weisshappel, Helmut, 4,186,957, Cl. 296-188.000.
Weil, Bradley S.; and Metz, Curtis F., III, to United States of America, Energy. Apparatus for shearing spent nuclear fuel assemblies. 4,186,657, Cl. 100-39.000.
Weiner, Arnold, to Knogo Corporation. Wafer and fastener for use in electronic theft detection system. 4,187,509, Cl. 343-873.000.
Weiss, Frantisek: *See*—
Dolezal, Ladislav; Weiss, Frantisek; Stanek, Petr; and Lorenc, Miroslav, 4,186,610, Cl. 73-805.000.
Weisshappel, Helmut: *See*—
Lutze, Hans; Weidemann, Dieter; and Weisshappel, Helmut, 4,186,957, Cl. 296-188.000.
Welboren, Joseph A.: *See*—
de Jong, Hendrikus; and Welboren, Joseph A., 4,186,665, Cl. 105-456.000.
Welch, Charlie R. Dump-truck tail gate spread chain release device. 4,186,958, Cl. 296-50.000.
Welch, Robert F.; and Stamm, Russell D., to General Instrument Corporation. Tuner driving mechanism permitting play in location of input member. 4,186,612, Cl. 74-10.800.
Welge, Frederick T.: *See*—
Redmore, Derek; and Welge, Frederick T., 4,187,245, Cl. 260-502.500.
Wellman, Russel E.; and Brown, Robert W., to Xerox Corporation. Encapsulation process. 4,187,194, Cl. 252-316.000.
Wenninger, Fred, Jr.: *See*—
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,187,547, Cl. 364-710.000.

Wessling, Ritchie A.: *See*—
Pickelman, Dale M.; Foster, William A.; and Wessling, Ritchie A., 4,187,142, Cl. 162-146.000.

Westcott, Vernon C.; and Bowen, John P., to Foxboro/Trans-Sonics, Inc. Magnetic techniques for separating non-magnetic materials. 4,187,170, Cl. 209-1.000.

Western Gear Corporation: *See*—
Fessett, Donald J., 4,186,624, Cl. 74-679.000.

Westinghouse Electric Corp.: *See*—
Braun, Howard E.; Dollard, Walter J.; and Tower, Stephen N., 4,187,147, Cl. 176-38.000.
Evans, Gary E., 4,187,508, Cl. 343-770.000.
Hine, Louis P., 4,186,474, Cl. 29-157.30A.
Lange, Frederick F., 4,187,116, Cl. 106-44.000.
Mueller, Norman P.; and Mutafelija, Boris A., 4,187,144, Cl. 176-24.000.
Peterson, Charles A., 4,187,524, Cl. 361-16.000.
Shen, Ti-Ke; and Coombe, John R., 4,187,146, Cl. 176-37.000.

Weyl, Helmut: *See*—
Steinke, Leo; and Weyl, Helmut, 4,187,163, Cl. 204-195.00S.

Wheeler, Colin. Rotary machine. 4,187,064, Cl. 418-187.000.

Whirlpool Corporation: *See*—
Brenner, Robert A.; and Cuthbert, Victor W., 4,186,573, Cl. 68-12.00R.
Thomson, Eugene F., 4,186,978, Cl. 312-138.00A.

White, Barry F., to Summit Packaging Systems, Inc. Continuous aerosol device. 4,186,853, Cl. 222-182.000.

White Consolidated Industries, Inc.: *See*—
Sundstrom, John A., 4,186,574, Cl. 68-17.00A.

White, Jack D., Jr., to Dayco Corporation. Wheel wedge. 4,186,823, Cl. 188-32.000.

White, Ronald P.: *See*—
Ballard, Samuel S.; and White, Ronald P., 4,187,490, Cl. 367-121.000.

White, Stanley A.: *See*—
Vitols, Visvaldis A.; and White, Stanley A., 4,187,519, Cl. 358-169.000.

Whitescarver, Olin D., to Union Oil Company of California. Handling fluid discharged from a conduit at a high velocity. 4,187,087, Cl. 55-43.000.

Whitman, William C. Solar energy heat collector. 4,186,721, Cl. 126-430.000.

Whitney, C. David. Multi-throw magnetic reed switch. 4,187,483, Cl. 335-206.000.

Widell, Marja: *See*—
Johannisson, Tom; Nilsson, Kai; Sjoblom, Rolf; and Widell, Marja, 4,186,582, Cl. 72-60.000.

Wieder, Irwin, to Analytical Radiation Corp. Continuously variable laser output coupler. 4,187,475, Cl. 331-94.50S.

Wiegand, Karl E.; Kao, James T. F.; and Dagani, Michael J., to Ethyl Corporation. Preparation of 5-aroyl-pyrrole compounds. 4,187,230, Cl. 260-326.470.

Wigley, Patrick A.; Dana, Edwin L.; and Pletz, Alfred, Jr., to CPS, Inc. Voltage power supply. 4,187,535, Cl. 363-16.000.

Wilcox, Richard L.; and Conrad, Sherman E., to Delavan Manufacturing Company. By-pass nozzles. 4,186,877, Cl. 239-124.000.

Wilder, Gene R.: *See*—
Maender, Otto W.; and Wilder, Gene R., 4,187,249, Cl. 260-576.000.
Merten, Helmut L.; and Wilder, Gene R., 4,187,248, Cl. 260-576.000.

William H. Byler and Thelma Byler, Trustees of William H. Byler Revocable Trust: *See*—
Byler, William H., 4,186,746, Cl. 128-403.000.

William H. Rorer, Inc.: *See*—
Nuss, George W., Jr.; Santora, Norman J.; and Douglas, George H., 4,187,317, Cl. 424-309.000.

Williams, Charlie L.: *See*—
Wehrmann, Nicholas; and Williams, Charlie L., 4,186,471, Cl. 28-154.000.

Willis, Roland G., to Eastman Kodak Company. Heat developable material and process. 4,187,108, Cl. 430-203.000.

Willmann, Michael: *See*—
Danckert, Hermann; Willmann, Michael; and Wundrak, Egon, 4,186,714, Cl. 123-195.00C.

Willy, John R.: *See*—
Lapp, John; and Willy, John R., 4,187,327, Cl. 427-8.000.

Wilson, Marlin V.; Nickell, Lawrence C.; and Nickell, Larry C., to Appalachian Electronic Instruments, Inc. Yarn tension control apparatus of the ball and funnel type. 4,186,898, Cl. 242-152.100.

Winnan, Hewart W., to Dow Corning Limited. Colored organosiloxane elastomers with improved flame retardancy. 4,187,208, Cl. 260-37.0SB.

Wirz, Walter, to Fahrni, Peter, Dr. Method and apparatus for deflecting a stream of spreadable particles. 4,186,847, Cl. 222-1.000.

Wishart, John D. Split cycle internal combustion engines. 4,186,561, Cl. 60-620.000.

Witmore, Ronald K.: *See*—
Maxfield, Thomas G.; and Witmore, Ronald K., 4,187,399, Cl. 179-15.0BY.

Witzeman, John S.: *See*—
Serafino, James M.; Yadlowsky, Slawko; and Witzeman, John S., 4,187,326, Cl. 426-590.000.

Wolfendale, Peter C. F., to Automatic Systems Laboratories Limited. Digital measurement of impedance ratios. 4,187,459, Cl. 324-60.00C.

Wollenhaupt, Karl-Heinz: *See*—
Weber, Heinrich; Lorenz, Kurt; Dungs, Horst; and Wollenhaupt, Karl-Heinz, 4,187,079, Cl. 44-10.00C.

Wollnik, Hermann. Coil arrangement for electromagnetically influencing magnetic fields, in particular for homogenizing magnetic dipoles. 4,187,485, Cl. 335-299.000.

Wolski, Adolph, to Ni-Tec, Inc. Method and apparatus for constructing electronic devices. 4,186,980, Cl. 316-19.000.

Wood, Donald C.: *See*—
McLaughlin, Robert L.; and Wood, Donald C., 4,187,190, Cl. 252-99.000.

Wood, Prentice J., to Mead Corporation, The. Means for preventing the disfigurement of bottle labels. 4,186,867, Cl. 229-40.000.

Woods, Leslie A.; and Van Peski, Christopher. Electro-mechanical docking apparatus and method. 4,186,939, Cl. 280-477.000.

Woolley, Ronald L., to Billings Energy Corporation. Method and apparatus for providing increased thermal conductivity and heat capacity to a pressure vessel containing a hydride-forming metal material. 4,187,092, Cl. 62-48.000.

Work, John T., to BJ-Hughes Inc. Deck-mounted shaft bushing. 4,186,973, Cl. 308-3.900.

Woythal, Gerald C., to Borg-Textile Corporation. Non-seizing closed loop film transport system. 4,186,892, Cl. 242-55.19R.

Wright, Ansel J.: *See*—
Rogers, Ronald A.; Wright, Ansel J.; and Wright, William H., 4,186,659, Cl. 101-47.000.

Wright, James J.: *See*—
Kuhn, James O.; Wright, James J.; and Bollinger, Howard N., 4,186,517, Cl. 46-119.000.

Wright, Larry G.: *See*—
Milberger, Walter E.; and Wright, Larry G., 4,187,458, Cl. 323-17.000.

Wright, William H.: *See*—
Rogers, Ronald A.; Wright, Ansel J.; and Wright, William H., 4,186,659, Cl. 101-47.000.

Wrightson, John M., to Aerojet-General Corporation. Polymeric isocyanate-hydroxy terminated polybutadiene compositions. 4,187,215, Cl. 528-51.000.

Wulff, Richard F. Carpet brush attachment for a floor treating machine. 4,186,459, Cl. 15-180.000.

Wundrak, Egon: *See*—
Danckert, Hermann; Willmann, Michael; and Wundrak, Egon, 4,186,714, Cl. 123-195.00C.

WWG Industries, Inc.: *See*—
Chambley, Phillip W.; and Norris, Alan H., 4,186,549, Cl. 57-293.000.

Xanthopoulos, Piritheous, to Stewart-Naumann Laboratories, Inc. Peristaltic infusion pump and disposable cassette for use therewith. 4,187,057, Cl. 417-63.000.

Xerox Corporation: *See*—
Hug, William F.; Hamerdinger, Randolph W.; Dunn, Phillip D.; and McQuillan, Robert C., 4,187,474, Cl. 331-94.50D.
Tutihasi, Simpei, 4,187,104, Cl. 430-57.000.
Wellman, Russel E.; and Brown, Robert W., 4,187,194, Cl. 252-316.000.

Yadlowsky, Slawko: *See*—
Serafino, James M.; Yadlowsky, Slawko; and Witzeman, John S., 4,187,326, Cl. 426-590.000.

Yagihara, Morio; Tanaka, Mitsugu; Hirose, Takeshi; and Aono, Toshiaki, to Fuji Photo Film Co., Ltd. Silver halide photographic light-sensitive material. 4,187,110, Cl. 430-544.000.

Yamada, Takeo; Ando, Seigo; Miyashita, Yoshio; Murakami, Katsuhiko; Tate, Masahisa; and Mizui, Kiyoshi, to Nippon Kokan Kabushiki Kaisha. Apparatus for monitoring and controlling the level of the molten metal in the mold of a continuous casting machine. 4,186,792, Cl. 164-150.000.

Yamaga, Eiichi: *See*—
Hiyoshi, Teruo; Nakada, Akira; Uchiyama, Yasuji; Yamaga, Eiichi; and Aoki, Eiichiro, 4,186,640, Cl. 84-1.030.

Yamaguchi, Nobutaka; Fujiyama, Masaaki; and Takayama, Satoru, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,187,345, Cl. 428-337.000.

Yamaguchi, Takashi: *See*—
Inoue, Eiichi; and Yamaguchi, Takashi, 4,187,424, Cl. 250-315.100.

Yamaha Hatsukoki Kabushiki Kaisha: *See*—
Matsumoto, Hiromitsu, 4,186,706, Cl. 123-127.000.

Yamamoto, Toshiaki: *See*—
Harmon, William M.; Holtzmeier, Lindell R.; and Yamamoto, Toshiaki, 4,186,539, Cl. 52-580.000.

Yamamoto, Yasunobu; Tomikawa, Ryoichi; Sakabe, Toshiaki; and Matsumoto, Yasuhiro, to Aisin Seiki Kabushiki Kaisha. Method for manufacturing a clutch facing. 4,187,133, Cl. 156-166.000.

Yamashita, Chikao; Sugaya, Takao; and Yoshida, Noriyuki, to Brother Kogyo Kabushiki Kaisha. Device for driving information carrying members for use in a sewing machine. 4,186,675, Cl. 112-158.00D.

Yamashita, Keitarou: *See*—
Harada, Hideki; and Yamashita, Keitarou, 4,187,330, Cl. 430-103.000.

Yamazaki, Eiichi: *See*—
Ueyama, Takehiko; Nishizawa, Masahiro; Yamazaki, Eiichi; and Ogura, Iwao, 4,187,012, Cl. 354-1.000.

Yang, Charles C.: *See*—
Peltzman, Alan; and Yang, Charles C., 4,187,153, Cl. 203-81.000.

Yano, Kohzo; Hishida, Tadanori; Inami, Yasuhiko; and Wada, Tomio, to Sharp Kabushiki Kaisha. Negative type display in electrochromic display device. 4,187,004, Cl. 350-357.000.

Yarbrough, Jon A. Fiberboard chair construction. 4,186,965, Cl. 297-442.000.

Yarmilko, Vladimir G.: *See*—
Datsenko, Nikolai M.; Pushanko, Nikolai N.; and Yarmilko, Vladimir G., 4,187,172, Cl. 209-44.300.

Yarovinsky, Grigory A.: *See*—
Teplinsky, Anatoly D.; Yarovinsky, Grigory A.; Snezhnoi, Rostislav L.; Burakov, Savely L.; Serebro, Vladimir S.; Ryvkis, Yakov M.; Kolienko, Lidia P.; Bolshakov, Anatoly I.; Antonov, Vladimir A.; Tsaizer, Gerbert G.; Shapiro, Moisei S.; and Pekarsky, Mark M., 4,186,793, Cl. 164-158.000.

Yascheritsyn, Petr I.; Sakulevich, Faddei J.; Olender, Leonty A.; and Kosobutsky, Alexandr A. Machine for treating spherical surfaces of parts with magneto-abrasive powder. 4,186,528, Cl. 51-161.000.

Yashiro, Kuniji; Ayano, Yukihiko; and Miyazaki, Yasushi, to Nihon Parkerizing Co., Ltd. Surface processing solution and surface treatment of aluminum or aluminum alloy substrate. 4,187,127, Cl. 148-6.15R.

Yasuda, Yushiro; and Bessho, Hironori, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas purification promoting device. 4,186,697, Cl. 123-117.00A.

Yates, Derek N.; and Presta, John C., to Celanese Corporation. Fiber reinforced composite shaft with metallic connector sleeves mounted by longitudinal groove interlock. 4,187,135, Cl. 156-187.000.

Yeh, Chan H. Korean (hangul) electronic typewriter and communication equipment system. 4,187,031, Cl. 400-83.000.

Yen, Shiao-Ping S.: *See*—
Rembaum, Alan; Yen, Shiao-Ping S.; and Klein, Elias, 4,187,333, Cl. 427-230.000.

Yim, Nelson C.: *See*—
Holden, Kenneth G.; and Yim, Nelson C., 4,187,314, Cl. 424-282.000.

Yiu, Joseph T.; Lea, Jeffrey G.; and Holmes, Roy L., to Hy-Gain de Puerto Rico, Inc. Scanning receiver. 4,187,464, Cl. 325-470.000.

Yockey, Francis J.: *See*—
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,187,547, Cl. 364-710.000.

Yoshida, Dan; Onaka, Tatsumi; and Horiuchi, Yasuhiro, to Fuji Kuuki Kabushiki Kaisha; and Hitachi Zosen Kabushiki Kaisha. Air motor with discharge through gear chamber and silencer. 4,187,063, Cl. 418-90.000.

Yoshida Kogyo K.K.: *See*—
Yunoki, Akio, 4,186,863, Cl. 227-131.000.

Yoshida, Noriyuki: *See*—
Yamashita, Chikao; Sugaya, Takao; and Yoshida, Noriyuki, 4,186,675, Cl. 112-158.00D.

Yoshida, Shohei: *See*—
Narisawa, Shigeyuki; Yoshida, Shohei; and Kawahara, Hiroshi, 4,187,377, Cl. 544-219.000.

Youngblood, John W. Vehicle tow bar. 4,186,938, Cl. 280-402.000.

Yu, Arthur J.: *See*—
Goswami, Jagadish C.; and Yu, Arthur J., 4,187,159, Cl. 204-159.170.

Yum, Dooho, to Beltone Electronics Corporation. Amplifier employing matched transistors to provide linear current feedback. 4,187,472, Cl. 330-260.000.

Yunoki, Akio, to Yoshida Kogyo K.K. Staple fastener applying machine. 4,186,863, Cl. 227-131.000.

Zahnradfabrik Friedrichshafen AG: *See*—
Jablonsky, Erich, 4,186,818, Cl. 180-133.000.

Zalesak, Jan; and Kovar, Jan, to Vyzkumny ustav tvarecich stroju a technologie tvareni. Apparatus for the discharge of waste ends of bars in the cross wedge rolling process. 4,186,580, Cl. 72-14.000.

Zalesak, Jan: *See*—
Kovar, Jan; Drkal, Jan; Zalesak, Jan; and Hladky, Vaclav, 4,186,583, Cl. 72-108.000.

Zaman, Shakir U.: *See*—
Noyes, Richard C.; and Zaman, Shakir U., 4,187,145, Cl. 176-36.00R.

Zaniewski, Michel H. Ring clamp and method of making same. 4,186,468, Cl. 24-243.00B.

Zauser, Ludwig: *See*—
Burghardt, Wilfried; Vogel, Rolf; and Zauser, Ludwig, 4,186,895, Cl. 242-107.40B.

Zaydel, Wieslaw S., to General Motors Corporation. Plastic plug, nut and stud fastener assembly. 4,186,645, Cl. 85-83.000.

Zeblisky, Rudolph J., to Kollmorgen Technologies Corp. Novel precious metal sensitizing solutions. 4,187,198, Cl. 252-434.000.

Zecher, Wilfried; Clarenz, Werner; Dunwald, Willi; and Merten, Rudolf, to Bayer Aktiengesellschaft. Process for the production of polycondensate containing cyclic imide groups. 4,187,365, Cl. 528-45.000.

Zeeh, Bernd: *See*—
Goetz, Norbert; Mangold, Dietrich; and Zeeh, Bernd, 4,187,227, Cl. 548-226.000.

Zegeer, Jim: *See*—
Rough, J. Kirkwood H., 4,187,453, Cl. 318-135.000.

Zehel, Joseph J.; and Kreis, Joseph W., to Globe-Union Inc. Printed circuit contact. 4,187,417, Cl. 200-254.000.

Zeller, Gary P.; and Landwehr, DeWayne A., to General Motors Corporation. Energy absorbing cellular matrix for vehicles. 4,186,915, Cl. 267-140.000.

Zeller, Paul: *See*—
Hromatka, Otto; Binder, Dieter; Zeller, Paul; and Pfister, Rudolf, 4,187,303, Cl. 424-246.000.

Zenith Radio Corporation: *See*—
Avicola, Richard; and Tzakis, George J., 4,187,537, Cl. 363-127.000.
Tanaka, Akio, 4,187,469, Cl. 325-464.000.

Zezza, Louis J., to Automation Industries, Inc. High density fuel storage rack. 4,187,433, Cl. 250-507.000.

Zhitetsky, Leonid S.: *See*—
Skurikhin, Vladimir I.; Fainzilberg, Leonid S.; and Zhitetsky, Leonid S., 4,187,541, Cl. 364-497.000.

Zhmurov, Vyacheslav I.: *See*—
Gorodissky, Leonid G.; Vasilieva, Raisa V.; Zhmurov, Vyacheslav I.; Kozlov, Mikhail D.; Kuzmina, Vera I.; and Romanov, Nikolai T., deceased, 4,186,571, Cl. 68-5.00E.

Zicko, James A., to Container Corporation of America. Dispenser container with cover. 4,186,866, Cl. 229-17.00B.

Zijlstra, Jan G. H., to AHI Operations Limited. Wash-house fitting including a trough. 4,186,770, Cl. 137-572.000.

Zimmer, Erich: *See*—
Morschl, Paul; and Zimmer, Erich, 4,187,280, Cl. 423-15.000.

Zimmermann, Andreas, to BBC Brown, Boveri & Company, Ltd. Method and apparatus for operating an electrophoretic indicating element. 4,187,160, Cl. 204-180.00R.

Zinke, Horst; Lorenz, Hans J.; and Linhart, Helmut, to Ciba-Geigy Corporation. Stabilization systems from triarylphosphites and phenols. 4,187,212, Cl. 260-45.8NT.

Zitz, Alfred: *See*—
Gebetsroither, Wolfgang; and Zitz, Alfred, 4,186,971, Cl. 299-64.000.

Zoltan, Bart J., to Singer Company, The. Internal reference for stellar tracker. 4,187,422, Cl. 250-203.00R.

Zotos International, Inc.: *See*—
Edman, Walter W.; and Farer, Irving L., 4,186,855, Cl. 222-321.000.

Zudkevitch, David: *See*—
Roth, David W. H., Jr.; and Zudkevitch, David, 4,187,152, Cl. 203-62.000.

Zukowski, Leonard J., to TRW Inc. Variably preloaded ball joint assembly. 4,187,033, Cl. 403-137.000.

Zydzik, George J.: *See*—
Singh, Shobha; Van Uitert, LeGrand G.; and Zydzik, George J., 4,187,530, Cl. 361-433.000.

1st National Bank: *See*—
Creekmore, Robert V., 4,187,498, Cl. 340-149.00A.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 5TH DAY OF FEBRUARY, 1980

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Carton, Michael L.; and Huetsch, Larry C., to Wagner Electric Corporation. Vehicle brake system. Re. 30,205, Cl. 303-7.000.

Caterpillar Tractor Co.: *See*—
Montgomery, Alvin W., Re. 30,203, Cl. 123-140.00R.

Eaton Corporation: *See*—
Kolze, Lawrence A.; and Jones, William H., Re. 30,207, Cl. 200-81.00R.

Ferguson, John G.; and Waters, Geoffrey D., to Rolls Royce (1971) Limited. Seals and method of manufacture thereof. Re. 30,206, Cl. 415-174.000.

Henke, Donald L., to Veda, Inc. Hay stacking machine. Re. 30,200, Cl. 56-346.000.

Huetsch, Larry C.: *See*—
Carton, Michael L.; and Huetsch, Larry C., Re. 30,205, Cl. 303-7.000.

International Shoe Machine Corporation: *See*—
Vornberger, Walter, Re. 30,202, Cl. 118-705.000.

Jones, William H.: *See*—
Kolze, Lawrence A.; and Jones, William H., Re. 30,207, Cl. 200-81.00R.

Kolze, Lawrence A.; and Jones, William H., to Eaton Corporation. Means for calibrating pressure switches at extra-low pressure settings. Re. 30,207, Cl. 200-81.00R.

Montgomery, Alvin W., to Caterpillar Tractor Co. Fuel control cross shaft. Re. 30,203, Cl. 123-140.00R.

Rolls Royce (1971) Limited: *See*—
Ferguson, John G.; and Waters, Geoffrey D., Re. 30,206, Cl. 415-174.000.

Root, James R., to Ruskin Manufacturing Company. Control damper. Re. 30,204, Cl. 137-77.000.

Ruskin Manufacturing Company: *See*—
Root, James R., Re. 30,204, Cl. 137-77.000.

Stahlecker, Fritz; and Stahlecker, Hans. Method and apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine. Re. 30,201, Cl. 57-263.000.

Stahlecker, Hans: *See*—
Stahlecker, Fritz; and Stahlecker, Hans, Re. 30,201, Cl. 57-263.000.

Veda, Inc.: *See*—
Henke, Donald L., Re. 30,200, Cl. 56-346.000.

Vornberger, Walter, to International Shoe Machine Corporation. Cement applying mechanism. Re. 30,202, Cl. 118-705.000.

Wagner Electric Corporation: *See*—
Carton, Michael L.; and Huetsch, Larry C., Re. 30,205, Cl. 303-7.000.

Waters, Geoffrey D.: *See*—
Ferguson, John G.; and Waters, Geoffrey D., Re. 30,206, Cl. 415-174.000.

LIST OF PLANT PATENTEES

Bailey, Catherine H.: *See*—
Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; Dayton, Daniel F.; Hough, L. Fredric; and Bailey, Catherine H., 4,499, Cl. 34.000.

Dayton, Daniel F.: *See*—
Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; Dayton, Daniel F.; Hough, L. Fredric; and Bailey, Catherine H., 4,499, Cl. 34.000.

Emerson, Frank H.: *See*—
Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; Dayton, Daniel F.; Hough, L. Fredric; and Bailey, Catherine H., 4,499, Cl. 34.000.

Gesellschaftsvertrag uber die Erfindergemeinschaft "OPTIMARA": *See*—
Holtkamp, Reinhold, 4,500, Cl. 69.000.

Holtkamp, Reinhold, to Gesellschaftsvertrag uber die Erfindergemeinschaft "OPTIMARA". African violet plant. 4,500, 2-5-80, Cl. 69.000.

Hough, L. Fredric: *See*—
Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; Dayton, Daniel F.; Hough, L. Fredric; and Bailey, Catherine H., 4,499, Cl. 34.000.

Janick, Jules: *See*—
Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; Dayton, Daniel F.; Hough, L. Fredric; and Bailey, Catherine H., 4,499, Cl. 34.000.

Purdue Research Foundation: *See*—
Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; Dayton, Daniel F.; Hough, L. Fredric; and Bailey, Catherine H., 4,499, Cl. 34.000.

Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; Dayton, Daniel F.; Hough, L. Fredric; and Bailey, Catherine H., to Purdue Research Foundation. Distinct cultivar of apple tree: COOP 16. 4,499, 2-5-80, Cl. 34.000.

LIST OF DESIGN PATENTEES

Aladdin Manufacturing Company: *See*—
Wintz, Donald E., 254,122, Cl. D9-184.000.

Alexander, Fred C., to Universal-Rundle Corporation. Combined bathtub and shower stall. 254,148, 2-5-80, Cl. D23-49.000.

Allen, Wesley D. Electric lamp. 254,155, 2-5-80, Cl. D48-20.00R.

American Research and Knitting, Inc.: *See*—
Avins, William O., 254,153, Cl. D47-2.000.

Avins, William O., to American Research and Knitting, Inc. Double knit fabric. 254,153, 2-5-80, Cl. D47-2.000.

Baltimore Aircoil Company, Inc.: *See*—
Engalitcheff, John, Jr., 254,149, Cl. D23-139.000.

Barton, Steven A.; and Gerard, David L. Cautery. 254,150, 2-5-80, Cl. D24-26.000.

Beall, Lester, to Trend Line Furniture Corporation. Seat. 254,107, 2-5-80, Cl. D6-62.000.

Beniya, Masaaki, to TDK Electronics Co., Ltd. Magnetic necklace. 254,126, 2-5-80, Cl. D11-6.000.

Benoit, Roland A. Seat. 254,106, 2-5-80, Cl. D6-59.000.

Breger, Carl-Arne, to Sandvik Aktiebolag. Protective helmet with ear muffs and face protection. 254,100, 2-5-80, Cl. D2-232.000.

Bussey, Harry, Jr. Loose fill packaging element. 254,123, 2-5-80, Cl. D9-294.000.

Carabetta, Vito J. Automobile body. 254,128, 2-5-80, Cl. D12-91.000.

Chandler, Marlene Y. Toilet tissue cover. 254,108, 2-5-80, Cl. D6-86.000.

Chromcraft Corporation: *See*—
Wilson, Robert L., 254,104, Cl. D6-31.000.

Colani, Luigi, to ITT Industries, Inc. Combined water control lever and cover plate. 254,147, 2-5-80, Cl. D23-29.000.

Criswell, John. Paint scraper holder. 254,103, 2-5-80, Cl. D2 400.000.

D. H. Baldwin Company: *See*—
Kimble, Thomas E., 254,137, Cl. D17-6.000.

Daenen, Robert H. C. M., to Dart Industries, Inc. Holder for a measuring spoon set or the like. 254,116, 2-5-80, Cl. D7-74.000.

Dart Industries, Inc.: *See*—
Daenen, Robert H. C. M., 254,116, Cl. D7-74.000.

Data Packaging Corporation: *See*—
Lyman, George; Mathus, Gregory; and Yonkers, Edward, 254,114, Cl. D6-234.000.

de Bock, Johannes M. M. H. Physical exerciser. 254,143, 2-5-80, Cl. D21-195.000.
De Masi, Robert J., to Utility Verification Corp. Telephone call cost determining device. 254,141, 2-5-80, Cl. D18-7.000.
Drevitch, Nolan A.: *See—*
Young, Warren H.; Drevitch, Nolan A.; and Rosati, Anthony G., 254,154, Cl. D48-20.00K.
Engalitcheff, John, Jr., to Baltimore Aircoil Company, Inc. Water injected cooling tower. 254,149, 2-5-80, Cl. D23-139.000.
Felix, Cristian J.; and Genaro, Donald M., to Singer Company, The. Sewing machine. 254,135, 2-5-80, Cl. D15-69.000.
Garden Maid, Inc.: *See—*
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Gerard, David L.: *See—*
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Gilbert, John H. Athletic sock. 254,101, 2-5-80, Cl. D2-330.000.
Greenfield, Martin L. Moon clock. 254,124, 2-5-80, Cl. D10-6.000.
Handler, Milton E.; and Sylvan, Richard. Workbench. 254,112, 2-5-80, Cl. D6-179.000.
Helena Rubinstein, Inc.: *See—*
Schaefer, Dora, 254,111, Cl. D6-157.000.
Hock, Donal D., to Turco Manufacturing Company. Combined trapeze bar and hand rings. 254,144, 2-5-80, Cl. D21-235.000.
Hosoe, Isao, to Sacea S.a.s. di Tirinnanzi Giampietro & Co. Chair. 254,105, 2-5-80, Cl. D6-31.000.
Iijima, Takekazu, to Pioneer Kabushiki Kaisha. Loudspeaker with grille. 254,130, 2-5-80, Cl. D14-30.000.
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Johnson, Howard B. Combined camper support and jack. 254,129, 2-5-80, Cl. D12-55.000.
K-tel International (Aust.) Limited: *See—*
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Kimble, Thomas E., to D. H. Baldwin Company. Organ console. 254,137, 2-5-80, Cl. D17-6.000.
Koenig, Jerome. Shut-off valve. 254,146, 2-5-80, Cl. D23-19.000.
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Kuipers, Marvin V. Multiple drum bracket. 254,140, 2-5-80, Cl. D17-22.000.
Lang, James L. Safety rail for sliding panels. 254,120, 2-5-80, Cl. D8-331.000.
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Lyman, George; Mathus, Gregory; and Yonkers, Edward, to Data Packaging Corporation. Display for photographs or the like. 254,114, 2-5-80, Cl. D6-234.000.
Marden, Jay W. Combined tractor, trailer, helicopter and vehicle toy. 254,152, 2-5-80, Cl. D21-134.000.
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Rickard, James H., 254,139, Cl. D17-20.000.
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Pax Technology Ltd.: *See—*
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Polaroid Corporation: *See—*
Young, Warren H.; Drevitch, Nolan A.; and Rosati, Anthony G., 254,154, Cl. D48-20.00K.
Powell, Christopher M. Plotting instrument. 254,125, 2-5-80, Cl. D10-61.000.
Price, Ronald L. Combined liquid dispenser and disposable cup holder. 254,109, 2-5-80, Cl. D6-91.000.
Prince, Jeremy'Jeyshire',. Headphone demonstration unit. 254,131, 2-5-80, Cl. D14-99.000.
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Richards, Shirley T. Undergarment shield. 254,096, 2-5-80, Cl. D2-225.000.
Richards, Shirley T. Undergarment shield. 254,097, 2-5-80, Cl. D2-225.000.
Richards, Shirley T. Undergarment shield. 254,098, 2-5-80, Cl. D2-225.000.
Richards, Shirley T. Undergarment shield. 254,099, 2-5-80, Cl. D2-225.000.
Rickard, James H., to Ovation Instruments, Inc. Guitar body or the like. 254,138, 2-5-80, Cl. D17-20.000.
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Sgroi, Carlo M., to Pax Technology Ltd. Combined flowerpot tray, and watering reservoirs. 254,127, 2-5-80, Cl. D11-153.000.
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Sheldon, Gary L., to Garden Maid, Inc. Combined auger and tine unit for a garden tiller. 254,133, 2-5-80, Cl. D15-12.000.
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Wilcock, Anthony C. Inline water filter. 254,145, 2-5-80, Cl. D23-4.000.
Wilson, Robert L., to Chromcraft Corporation. Chair. 254,104, 2-5-80, Cl. D6-31.000.
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Wolff, Henry. Combined lipstick and cigarette lighter. 254,151, 2-5-80, Cl. D28-77.000.
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CLASSIFICATION OF PATENTS

ISSUED FEBRUARY 5, 1980

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CLASS 51

23	4,187,081
33 R	4,186,526
58	4,186,527
161	4,186,528
288	4,186,529
295	4,187,082
307	4,187,083
308	4,187,084

CLASS 52

2	4,186,530
11	4,186,531
169.1	4,186,532
184	4,186,533
241	4,186,534
250	4,186,535
309.12	4,186,536
483	4,186,537
521	4,186,538
580	4,186,539
593	4,186,540
630	4,186,541

CLASS 53

88	4,186,542
515	4,186,543
537	4,186,544

CLASS 55

4	4,187,085
16	4,187,086
43	4,187,087
169	4,187,088
219	4,187,089
269	4,187,090
499	4,187,091

CLASS 56

113	4,186,545
202	4,186,546
330	4,186,547
346	Re.30,200

CLASS 57

58.89	4,186,548
263	Re.30,201
293	4,186,549

CLASS 58

21.13	4,186,550
23 R	4,186,551
88 W	4,186,552

CLASS 59

78.1	4,186,553

CLASS 60

39.03	4,186,556
39.37	4,186,554
330	4,186,555
361	4,186,557
527	4,186,558
531	4,186,559
599	4,186,560
620	4,186,561

CLASS 62

48	4,187,092
62	4,186,562
126	4,186,563
	4,187,093
180	4,186,564
306	4,186,565
380	4,186,566

CLASS 63

14 R	4,186,567

CLASS 64

1 V	4,186,568
23	4,186,569
28 R	4,186,570

CLASS 65

30 R	4,187,094
104	4,187,095

CLASS 68

5 C	4,186,572
5 E	4,186,571
12 R	4,186,573
17 A	4,186,574

CLASS 70

14	4,186,575
233	4,186,576
394	4,186,577
419	4,186,578

CLASS 71

90	4,187,096
	4,187,097
	4,187,098
	4,187,099
92	4,187,100
	4,187,101

CLASS 72

8	4,186,579
14	4,186,580
26	4,186,581
60	4,186,582
108	4,186,583
122	4,186,584
208	4,186,585
264	4,186,586
354	4,186,587
394	4,186,588
405	4,186,589

CLASS 73

23	4,186,590
49.2	4,186,591
73	4,186,592
117	4,186,593
118	4,186,594
132	4,186,595
136 A	4,186,597
136 C	4,186,596
144	4,186,598
194 EM	4,186,600
194 F	4,186,601
194 VS	4,186,599
228	4,186,602
231 R	4,186,603
295	4,186,604
341	4,186,605
351	4,186,606
422 GC	4,186,607
437	4,186,608
497	4,186,609
805	4,186,610

CLASS 74

10 A	4,186,611
10.8	4,186,612
52	4,186,613
63	4,186,614
89.15	4,186,615
200	4,186,616
245 S	4,186,617
339	4,186,618
414	4,186,619
424.8 R	4,186,620
459	4,186,621
501 R	4,186,622
572	4,186,623
679	4,186,624
780	4,186,625
801	4,186,626
869	4,186,627

CLASS 75

60	4,187,102

CLASS 76

108 A	4,186,628

CLASS 81

53 R	4,186,629

CLASS 82

4 C	4,186,630
5	4,186,631

CLASS 83

13	4,186,632
155	4,186,633
478	4,186,634

CLASS 84

1.01	4,186,635
	4,186,636
	4,186,637
	4,186,638
1.03	4,186,639
	4,186,640
1.16	4,186,641
1.24	4,186,642
	4,186,643
422 R	4,186,644

CLASS 85

83	4,186,645

CLASS 86

29	4,186,646

CLASS 89

1.8	4,186,647
36 A	4,186,648

CLASS 91

170 R	4,186,649
369 A	4,186,650
375 R	4,186,651
434	4,186,652

CLASS 92

34	4,186,653
78	4,186,654

CLASS 98

1	4,186,655
99 R	4,186,656

CLASS 100

39	4,186,657
148	4,186,658

CLASS 101

47	4,186,659
128.1	4,186,660
178	4,186,661
218	4,186,662

CLASS 102

18 MS	4,186,663
66	4,186,664

CLASS 105

456	4,186,665

CLASS 106

39.8	4,187,115
44	4,187,116
56	4,187,117
89	4,187,118
126	4,187,119

CLASS 108

29	4,186,666
53.5	4,186,667

CLASS 110

213	4,186,668
347	4,186,669

CLASS 111

1	4,186,670
2	4,186,671

CLASS 112

121.15	4,186,673
153	4,186,674
158 D	4,186,675
165	4,186,676
186	4,186,677
273	4,186,672

CLASS 113

121 C	4,186,678

CLASS 114

20 R	4,186,679
103	4,186,680
240 R	4,186,681

CLASS 116

171	4,186,682
235	4,186,683

CLASS 118

410	4,186,685
705	Re.30,202
725	4,186,684

CLASS 119

1	4,186,686
4	4,186,687
96	4,186,688
102	4,186,689
110	4,186,690

CLASS 123

32 EL	4,186,691
32 L	4,186,692
41.12	4,186,693
41.31	4,186,694
52 M	4,186,695
90.61	4,186,696
117 A	4,186,697
119 A	4,186,698
	4,186,699
	4,186,701
	4,186,702
	4,186,703
119 EE	4,186,700
122 AA	4,186,704
122 AC	4,186,705
127	4,186,706
139 AV	4,186,707
139 AW	4,186,708
140 R	Re.30,203
146.5 A	4,186,709
146.5 B	4,186,710
148 CB	4,186,712
148 CC	4,186,711
148 E	4,186,713
195 C	4,186,714
198 F	4,186,715

CLASS 126

29	4,186,716
66	4,186,717
67	4,186,718
143	4,186,719
270	4,186,722
299 D	4,186,727
430	4,186,721
443	4,186,723
	4,186,724
	4,186,725
444	4,186,726
445	4,186,720

CLASS 127

46 A	4,187,120

CLASS 128

1 R	4,186,728
1.3	4,186,729
24 R	4,186,732
32	4,186,733
33	4,186,734
153	4,186,738
158	4,186,739
201.19	4,186,736
201.25	4,186,735
203.28	4,186,737
214 R	4,186,740
218 P	4,186,741
270	4,186,742
284	4,186,743
287	4,186,744
349 R	4,186,745
403	4,186,746
660	4,186,747
736	4,186,731
	4,186,748
748	4,186,749
	4,186,750
	4,186,751
766	4,186,752
769	4,186,730

CLASS 130

27 T	4,186,753

CLASS 131

23 A	4,186,754
135	4,186,755
140 C	4,186,756
149	4,186,757

CLASS 134

26	4,187,121
95	4,187,122

CLASS 135

5 AT	4,186,758

CLASS 136

206	4,187,123

CLASS 137

77	Re.30,204
240	4,186,759
244	4,186,760
315	4,186,761
343	4,186,762
344	4,186,763
414	4,186,764
	4,186,765
458	4,186,766
501	4,186,767
516.25	4,186,768
566	4,186,769
572	4,186,770
596.17	4,186,771
604	4,186,772
625.23	4,186,774
625.3	4,186,773

CLASS 138

30	4,186,775
	4,186,776
31	4,186,777
97	4,186,475
103	4,186,778
121	4,186,779

CLASS 139

383 A	4,186,780
420 R	4,186,781

CLASS 141

7	4,186,782
18	4,186,783

CLASS 144

253 J	4,186,784

CLASS 145

32 R	4,186,785

CLASS 148

1.5	4,187,124
	4,187,125
	4,187,126
6.15 R	4,187,127
121	4,187,128

CLASS 149

21	4,187,129

CLASS 150

3 4,186,786

CLASS 151

41.73 4,186,787

CLASS 152

209 B 4,186,788
354 R 4,186,789

CLASS 156

42 4,187,130
79 4,187,131
88 4,187,132
166 4,187,133
170 4,187,134
187 4,187,135
192 4,187,136
195 4,187,137
512 4,187,138
600 4,187,139
662 4,187,140

CLASS 160

329 4,186,790

CLASS 162

23 4,187,141
146 4,187,142
157 R 4,187,143

CLASS 164

66 4,186,791
150 4,186,792
158 4,186,793

CLASS 165

2 4,186,794
53 4,186,795
105 4,186,796
120 4,186,797
147 4,186,798
176 4,186,799

CLASS 166

256 4,186,800
4,186,801
280 4,186,802
292 4,186,803

CLASS 171

16 4,186,804

CLASS 172

248 4,186,805
283 4,186,806

CLASS 174

15 CA 4,187,387
68.5 4,187,388
73 R 4,187,389
102 R 4,187,390
106 R 4,187,391

CLASS 175

96 4,186,810
302 4,186,807
334 4,186,808
4,186,809

CLASS 176

24 4,187,144
36 R 4,187,145
37 4,187,146
38 4,187,147

CLASS 178

22 4,187,392
4,187,393
58 R 4,187,394

CLASS 179

1 GA 4,187,395
1 SC 4,187,396
1 SG 4,187,397
2 EB 4,187,398
15 AA 4,187,400
15 BW 4,187,401
4,187,402
15 BY 4,187,399
84 VF 4,187,403
100 R 4,187,404
107 FD 4,187,413
175.3 F 4,187,415
175.3 S 4,187,414

CLASS 180

6.48 4,186,811
9.5 4,186,812
13 4,186,813
24 4,186,814
41 4,186,815
54 A 4,186,817
133 4,186,818
243 4,186,816

CLASS 181

265 4,186,819

CLASS 182

93 4,186,820

CLASS 184

7D 4,186,821

CLASS 188

1 A 4,186,822
32 4,186,823
73.5 4,186,824
196 R 4,186,825

CLASS 192

13 R 4,186,826
18 A 4,186,827
98 4,186,828
109 F 4,186,829

CLASS 193

35 R 4,186,830

CLASS 195

104 4,187,149

CLASS 198

501 4,186,831
861 4,186,832

CLASS 200

81 R Re.30,207
153 S 4,187,416
254 4,187,417
295 4,187,418
308 4,187,419
321 4,187,420

CLASS 202

182 4,187,150
185 R 4,187,151

CLASS 203

62 4,187,152
81 4,187,153

CLASS 204

5 4,187,154
43 S 4,187,166
67 4,187,155
73 R 4,187,156
157.1 R 4,187,157
159.17 4,187,159
159.2 4,187,158
180 R 4,187,160
195 P 4,187,162
195 S 4,187,161
4,187,163
196 4,187,164
254 4,187,165

CLASS 206

225 4,186,833
320 4,186,834
443 4,186,835

CLASS 208

8 R 4,187,167
139 4,187,168
157 4,187,169

CLASS 209

1 4,187,170
44.3 4,187,172
383 4,187,171
565 4,186,836
4,186,837
581 4,186,838

CLASS 210

23 H 4,187,173
32 4,187,174
80 4,187,175
151 4,187,176
198 C 4,187,177
232 4,187,178
238 4,187,179
321 R 4,187,180
332 4,187,181
445 4,187,182
501 4,187,183

CLASS 212

135 4,186,839

CLASS 215

247 4,186,840

CLASS 219

10.55 A 4,187,405
59.1 4,187,406
91.2 4,187,407
121 LM 4,187,408
121 P 4,187,409
137.2 4,187,410
4,187,411
441 4,187,412

CLASS 220

6 4,186,841
206 4,186,842
210 4,186,843
333 4,186,844
461 4,186,845
468 4,186,846

CLASS 222

1 4,186,847
23 4,186,848
25 4,186,849
28 4,186,850
113 4,186,851
146 HE 4,186,852
182 4,186,853
185 4,186,854
321 4,186,855
424.5 4,186,856

CLASS 223

72 4,186,444
94 4,186,857
4,186,858

CLASS 224

205 4,186,859

CLASS 226

91 4,186,860
118 4,186,861

CLASS 227

130 4,186,862
131 4,186,863

CLASS 228

226 4,186,864

CLASS 229

5.7 4,186,865
17 B 4,186,866
40 4,186,867
92.1 4,186,868

CLASS 232

17 4,186,869
35 4,186,870

CLASS 235

380 4,186,871

CLASS 236

34.5 4,186,872
44 A 4,186,873
46 R 4,186,874
47 4,186,875
49 4,186,876

CLASS 239

124 4,186,877
160 4,186,878
172 4,186,879
177 4,186,880
198 4,186,881
327 4,186,882
491 4,186,883
533.8 4,186,884
654 4,186,885
691 4,186,886

CLASS 241

20 4,186,887
46.06 4,186,888
89.2 4,186,889

CLASS 242

18 A 4,186,890
55.19 R 4,186,891
4,186,892
56.9 4,186,893
86.6 4,186,894
107.4 B 4,186,895
131 4,186,896
147 R 4,186,897
152.1 4,186,898

CLASS 244

3.13 4,186,899
113 4,186,900
137 R 4,186,901

CLASS 248

73 4,186,902
210 4,186,903
395 4,186,904
478 4,186,905

CLASS 249

41 4,186,906
94 4,186,907
197 4,186,908

CLASS 250

199 4,187,421
203 R 4,187,422
312 4,187,423
315.1 4,187,424
358 P 4,187,425
364 4,187,426
366 4,187,427
445 T 4,187,428
4,187,429
4,187,430
492 A 4,187,431
493 4,187,432
507 4,187,433
515 4,187,434
559 4,187,435

CLASS 251

31 4,186,909
149.6 4,186,910

CLASS 252

8.55 D 4,187,073
4,187,185
8.8 4,187,184
51.5 R 4,187,186
62.54 4,187,187
65 4,187,188
70 4,187,189
99 4,187,190
143 4,187,191
313 R 4,187,192
316 4,187,193
4,187,194
402 4,187,213
412 4,187,195
429 B 4,187,196
431 P 4,187,197
434 4,187,198
455 Z 4,187,199
472 4,187,200
512 4,187,201

CLASS 254

93 R 4,186,911

CLASS 256

1 4,186,912
13.1 4,186,913

CLASS 260

4 R 4,187,202
17.4 ST 4,187,219
18 N 4,187,203
22 CB 4,187,204
23.5 A 4,187,206
30.4 A 4,187,205
37 N 4,187,207
37 SB 4,187,208
38 4,187,209
42.14 4,187,210
42.44 4,187,211
45.8 NT 4,187,212
45.9 KA 4,187,214
112.5 R 4,187,216
4,187,217
158 4,187,218
239 A 4,187,221
239 B 4,187,220
239.8 4,187,226
239.9 4,187,225
245.3 4,187,228
326.47 4,187,230
332.1 4,187,231
343 4,187,222
343.3 R 4,187,223
345.2 4,187,233
346.22 4,187,224
4,187,234
4,187,236
346.75 4,187,235
347.3 4,187,237
376 4,187,238
410.6 4,187,239
429 R 4,187,240
438.1 4,187,241
463 4,187,242
464 4,187,243
465 E 4,187,244
502.5 4,187,245
559 R 4,187,246
574 4,187,247
576 4,187,248
4,187,249
578 4,187,250
586 R 4,187,251
653 4,187,252
662 R 4,187,253
665 G 4,187,254

CLASS 261

50 B 4,187,262
77 4,187,263
84 4,187,264

CLASS 264

22 4,187,265
40.1 4,187,267
43 4,187,266
151 4,187,268
171 4,187,269
4,187,270
4,187,271
4,187,272
322 4,187,273
325 4,187,274
511 4,187,275
515 4,187,276

CLASS 267

4 4,186,914
140 4,186,915

CLASS 269

303 4,186,916
325 4,186,917

CLASS 271

232 4,186,918
267 4,186,919

CLASS 272

96 4,186,920

CLASS 273

26 E 4,186,921
55 R 4,186,922
67 D 4,186,923
81.4 4,186,924
244 4,186,928
340 4,186,926
357 4,186,927
389 4,186,925

CLASS 277

27 4,186,929
166 4,186,930
207 A 4,186,931
4,186,932

CLASS 279

1 K 4,186,933

CLASS 280

221 4,186,934
269 4,186,935
277 4,186,936
289 E 4,186,937
402 4,186,938
477 4,186,939
507 4,186,940
743 4,186,941
804 4,186,942

CLASS 283

7 4,186,943
8 R 4,186,944

CLASS 285

19 4,186,945
94 4,186,946
112 4,186,947
177 4,186,948
226 4,186,949
270 4,186,950

CLASS 289

16.5 4,186,951

CLASS 290

27 4,187,436

CLASS 292

202 4,186,952
210 4,186,953
340 4,186,954

CLASS 294

1 R 4,186,955
16 4,186,956

CLASS 296

50 4,186,958
188 4,186,957

CLASS 297

16 4,186,959
63 4,186,960
216 4,186,961
250 4,186,962
308 4,186,963
422 4,186,964
442 4,186,965
452 4,186,966

CLASS 299

25 4,186,967
39 4,186,968
43 4,186,969
4,186,970
64 4,186,971

CLASS 303

7 Re.30,205

CLASS 307

147 4,187,437
268 4,187,438
271 4,187,439

CLASS 308

3.8 4,186,972
3.9 4,186,973
15 4,186,974
187 4,186,975

CLASS 310

24 4,187,440
112 4,187,441

CLASS 312

138 A 4,186,978
194 4,186,976
215 4,186,977
333 4,186,979

CLASS 313

60 4,187,442
402 4,187,443

CLASS 315

39.71 4,187,444
54 4,187,445
58 4,187,446
85 4,187,447
176 4,187,448
205 4,187,449
278 4,187,450
381 4,187,451

CLASS 316

19 4,186,980

CLASS 318

128 4,187,452
135 4,187,453
568 4,187,454
594 4,187,455
616 4,187,456
729 4,187,457

CLASS 323

17 4,187,458

CLASS 324

60 C 4,187,459
60 CD 4,187,460
102 4,187,461
204 4,187,462
228 4,187,463

CLASS 325

31 4,187,465
42 4,187,466
133 4,187,467
396 4,187,468
464 4,187,469
470 4,187,464

CLASS 330

4 4,187,470
260 4,187,472
277 4,187,471

CLASS 331

8 4,187,473
94.5 D 4,187,474
94.5 S 4,187,475
117 D 4,187,476

CLASS 333

14 4,187,477
4,187,478
28 R 4,187,479
161 4,187,480
182 4,187,481

CLASS 335

12 4,187,482
75 4,187,484
206 4,187,483
299 4,187,485

CLASS 338

34 4,187,486

CLASS 339

14 R 4,186,981
17 C 4,186,982
91 R 4,186,983
103 R 4,186,984
111 4,186,985
114 4,186,986
116 C 4,186,987
176 MP 4,186,988
258 R 4,186,989
4,186,990

CLASS 340

52 R 4,187,494
58 4,187,495
63 4,187,496
65 4,187,497
149 A 4,187,498
309.1 4,187,499
347 DD 4,187,500
554 4,187,501
566 4,187,502
624 4,187,503
652 4,187,504
753 4,187,505
852 4,187,489

CLASS 343

100 R 4,187,506
754 4,187,507
770 4,187,508
873 4,187,509

CLASS 346

21 4,187,510
75 4,187,511
140 R 4,187,512

CLASS 350

6.91 4,186,991
36 4,186,992
91 4,186,993
96.17 4,186,994
96.20 4,186,995
4,186,996
96.21 4,186,997
4,186,998
4,186,999
162 SF 4,187,000
202 4,187,001
314 4,187,002
357 4,187,003
4,187,004

CLASS 351

38 4,187,005
44 4,187,006
108 4,187,007

CLASS 352

4,187,008
130 4,187,009
162 4,187,010

CLASS 353

122 4,187,011

CLASS 354

1 4,187,012
4,187,013
33 4,187,019
62 4,187,014
109 4,187,015
152 4,187,016
173 4,187,017
195 4,187,020
266 4,187,018
293 4,187,021
318 4,187,022
321 4,187,023

CLASS 355

14 R 4,187,024

CLASS 356

133 4,187,025
326 4,187,026
400 4,187,027

CLASS 357

1 4,187,513
22 4,187,514
39 4,187,515
60 4,187,516
64 4,187,517

CLASS 358

93 4,187,518
169 4,187,519
257 4,187,520

CLASS 360

118 4,187,521
137 4,187,522

CLASS 361

16 4,187,524
30 4,187,523
42 4,187,525
120 4,187,526
235 4,187,527
399 4,187,528
404 4,187,529
433 4,187,530

CLASS 362

17 4,187,531
186 4,187,532
257 4,187,533
268 4,187,534

CLASS 363

16 4,187,535
21 4,187,536
127 4,187,537

CLASS 364

200 4,187,538
4,187,539
4,187,540
497 4,187,541
502 4,187,542
505 4,187,543
514 4,187,544
559 4,187,545
565 4,187,546
578 4,187,548
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